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The Fate of the Ovum and Graafian Follicle in Præ-menstrual Life.

By THOS. G. STEVENS, M.D. (Lond.), F.R.C.S. (Eng.), M.R.C.P. (Lond.), *Obstetric Tutor to St. Mary's Hospital, Paddington; Assistant Physician to the Hospital for Women, Soho Square; Demonstrator of Biology, Guy's Hospital.*

IT has been stated and apparently accepted as a fact that some Graafian follicles do not lie latent in the ovary from birth until puberty, and it has been suggested by Waldeyer,[1] Beigel,[2] and others that a process of ripening occurs, to be followed by atrophy and the formation of a kind of corpus luteum. The number of Graafian follicles contained in the ovaries at birth has been estimated at 70,000, and all observers are agreed that there are considerably less in the ovaries at puberty. The actual figures referred to must be viewed with some scepticism, because the enumeration of the Graafian follicles in an ovary cannot be a matter of any certainty, and there must be a large margin for errors of observation. However this may be, there is not the slightest vestige of a doubt that large numbers of Graafian follicles do disappear between birth and puberty. On the other hand, very few, if any, new follicles are formed after birth; sections of the ovaries of new-born children very seldom show ova and follicles in process of formation.

While the disappearance of Graafian follicles is accepted by all, the amount of literature actually bearing on this point is surprisingly

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small. A prolonged search through the papers dealing with work on young ovaries has not yielded much which throws any light on the method by which the ova and follicles disappear. De Sinéty[3] describes infants' ovaries, which show all stages of maturation up to what may be called ripeness (as far as præ-menstrual ovaries go), and although he mentions that retrograde changes occur, he does not make it clear how these take place. Slavianski[4] is largely quoted in respect to retrograde changes in Graafian follicles, but all his papers deal with adult ovaries and the retrograde changes in certain Graafian follicles which fail to burst and discharge their ova. Schotlaender,[6] too, describes well the development of the egg and follicle, but does not go deeply into the question of retrograde changes. One of Schotlaender's plates, however, is very interesting, as it shows an ovum with an included cell which corresponds closely with one of the stages of retrogression of the ovum which will be described in this paper. Scotlaender does not appear to have attached much importance to this specimen, except that he considered it worthy of record in a drawing. Paladino[7] describes the atrophy of Graafian follicles and ova in young females, but apparently his specimens were obtained from females after puberty. Henneguy,[8] in an interesting paper, goes fully into the retrograde changes in Graafian follicles in animals of various species; his specimens do not include those from human infants. However, one of his plates is interesting as it shows an ovum with included cells something like the appearances to be described later. This ovum was not human. Balfour,[9] too, shows an ovum with an included cell, but does not touch upon retrograde changes in infantile ovaries. Many other authors, among them Loewenthal,[10] Virchow,[11] Cadiat,[12] Langhans,[13] Pflüger,[14] Laulanie,[15] Pettitpierre,[16] Nagel,[17] Alexandrini,[18] Van Spee,[19] Von Kölliker,[20] McLeod,[21] Van Beneden,[22] Grohe,[23] have contributed excellent papers on the subject of the ovary in animals and human beings, but in none of them are the maturation and retrograde changes of Graafian follicles in infants fully described.

The researches, the subject of this paper, were undertaken to try and determine to what degree the Graafian follicle does mature in præ-menstrual life, and if possible to show the retrograde stages until a scar is formed, and also to show what becomes of the ovum during these retrograde changes. The material for these investigations—upwards of 70 pairs of ovaries of children of various ages (but always under 10 years, so as to eliminate the possibility of menstruation having been established)—was collected from the *post-mortem* rooms of Guy's Hospital and the Evelina Hospital for

Sick Children, with occasionally specimens from other places sent by friends. The method of preparation of the earlier specimens was simple hardening in alcohol after cutting the ovary in two in its long axis. This was not found to be very satisfactory, and so the later specimens were fixed *whole* in saturated solution of corrosive sublimate and then the hardening carefully completed in alcohols of increasing strengths beginning at 30 per cent. and ending with absolute. In the earlier specimens it was found that hemisection of the ovary nearly always opened the larger follicles, which, of course, were the most important to keep entire, the contents nearly always being lost during section. When, however, the ovaries were hardened whole and embedded whole in paraffin good results were obtained, and the various stages of development to be described were almost always found. The human ovary is always a most difficult object to cut good serial sections of, and embedding them whole does not make the process any easier. However, by paying great attention to thorough dehydration and slow saturation with paraffin at as low a temperature as possible consistent with its melting point, it was found to be possible to cut good serial sections. There is no doubt that the results to be described depend entirely on the method of fixation and embedding; no complete series of changes in Graafian follicles can be obtained if the ovaries are first cut in half. One cannot but believe that this is the reason why these changes have not been previously completely described. Various stains were used for the sections, but on the whole hæmatoxylin and eosin or carmine and picro-nigrosin were found to give the best results. Eosin was found to be especially useful as a counter-stain in those specimens in which it was required to stain blood-vessels and blood-corpuscles.

Before describing the various steps by which the Graafian follicle matures and then gradually disappears, leaving a fibrous scar, it may be said at once that no rupture of the follicle takes place, and nothing in the least approaching the structure of a corpus luteum is formed. The follicle and contained ovum matures up to a certain point by definite steps, then a kind of phagocytosis takes place by which the ovum is removed, and finally the contents of the follicle are absorbed by a species of granulation tissue which forms in its wall. From this granulation tissue new connective tissue is formed which gradually fills up the cavity and seems to contract as the cavity becomes less and less, at last nothing remains but a cicatrix with very few cellular elements in it.

It is not intended to touch upon the development of the Graafian

follicle and primordial ova in this paper, the researches of Waldeyer[1] and Foulis,[24] which have been confirmed by many others, seem to be sufficiently convincing to require no further confirmation or criticism. But, nevertheless, it is interesting to note that in all these specimens there is little or no evidence of any actual formation of new Graafian follicles going on, and so it would appear that the oft-repeated statement is true in general, that all the ova are formed before or just after birth. If a complete section in the long direction of a child's ovary is examined it will be found at once that there are many follicles present in different stages of development. The youngest follicles will be found all over the surface of the ovary, and especially at the two ends, where many layers of follicles will be found, all at the same stage of development. As the follicle begins to enlarge it will be found deeper in the substance of the ovary. The largest follicles, sometimes as much as 5mm. in diameter, approach the surface, not with a view to rupture, but simply because the ovary is not large enough to contain them otherwise. It is interesting to note that it is not uncommon to find quite young children's ovaries containing several very large follicles, for instance, the two (from different children) shown in Fig. 14, drawn three times their natural size. These are in no way pathological, and there is plenty of evidence to show that such large follicles do eventually contract without bursting, and finally form a fibrous scar. Such ovaries no doubt have often been described as cystic, and have been looked upon as pathological erroneously.

The youngest Graafian follicles, those which may be termed dormant follicles, together with their contained ova, measure on an average ·0325mm., this measurement practically being that of the ovum itself, as the covering of the follicle consists at this stage of flattened cells only, closely applied to the ovum. There is no particular evidence here of a proper fibrous tunic to the Graafian follicle, and the flattened cells look like and stain in the same manner as the connective tissue cells of the ovary around them. The ovum usually shrinks a little away from the follicle, no doubt on account of the method of preparation of the specimen. The more carefully the ovaries are fixed before cutting sections the less shrinkage will be seen. At this stage there is no evidence of a zona radiata surrounding the ovum. The nucleus of the ovum measures on an average ·013mm. in diameter, and there is a well-marked nucleolus present (Fig. 1).

Fig. 2 shows the first stage undergone by the dormant follicles towards maturation. The most marked change seen is that the

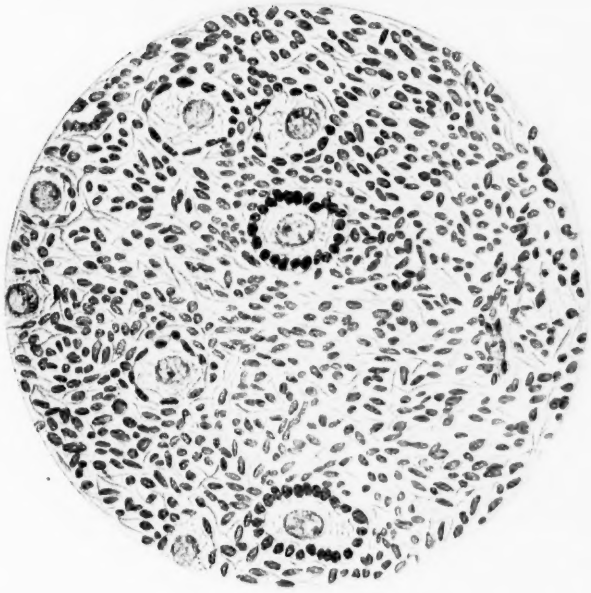

FIG. 2. First changes in Graafian Follicle. Ovum measures ·045 × ·025 mm. Three stages of growth shown. ×300.

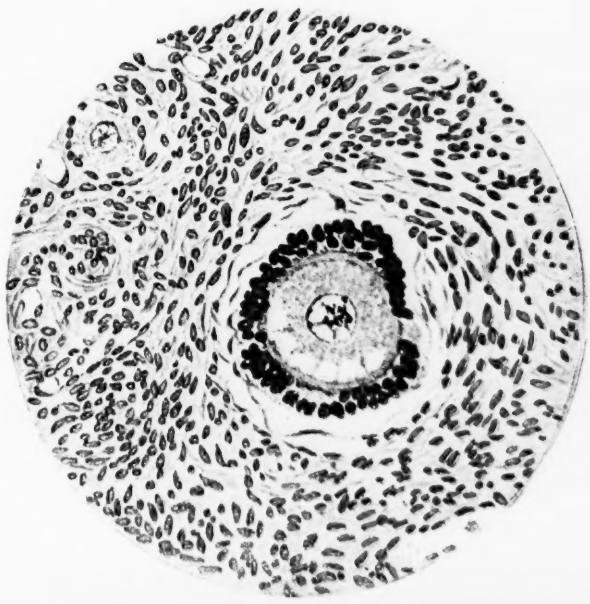

FIG. 3. Enlarging Graafian Follicle. Membrana Granulosa two layered. ×300. Ovum measures ·065 mm. in diameter. Graafian Follicle measures ·115 mm. in diameter.

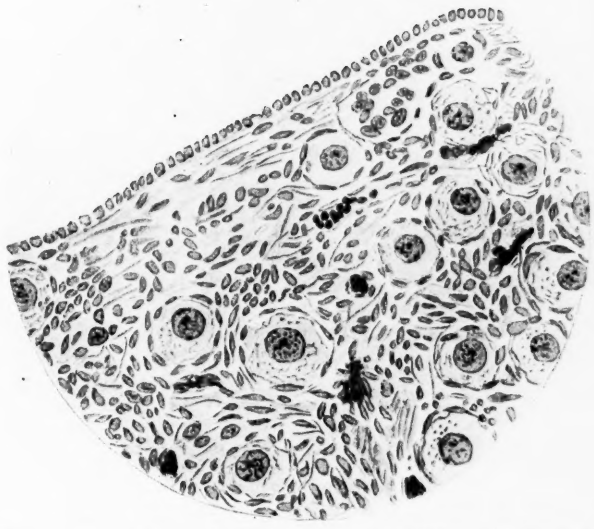

FIG. 1.—Young "dormant" ova. Average size ·0325mm. in diameter. ×300.

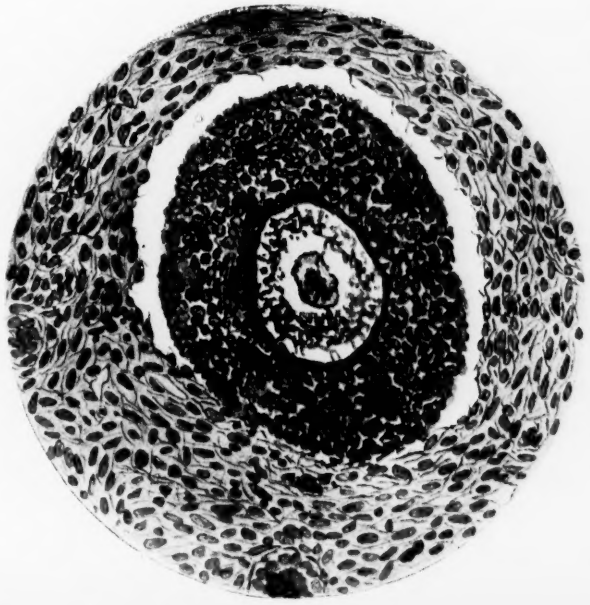

FIG. 4.—Enlarging Graafian Follicle. Membrana Granulosa many layered. Ovum measures ·075mm. in diameter. Follicle measures ·18mm. in diameter. ×220.

flattened cells surrounding the ovum proliferate, the number of cells in the specimen shown being treble the average number in a dormant follicle. At the same time, the cells are altered in shape, so that they now assume a cubical form and look much more like an epithelial lining to the follicle. This marks the first appearance of the membrana granulosa. The cell bodies at this stage are small as compared with the nuclei, and are therefore very little in evidence. The particular follicles shown in the drawing are somewhat flattened, no doubt in preparation of the specimen. The ovum here measures ·045mm. long by ·025mm. broad. The ovum practically fills the follicle as in the dormant follicles. The nucleus is a little larger than that of a dormant ovum, and measures ·02mm. in diameter. There is no fibrous tunic yet developed, although here and there concentric fibres can be seen which look as if the fibrous tunic was beginning to form. The figure shows well how the flattened cells increase in number and size to form the membrana granulosa, three distinct stages being present in the drawing. These follicles are the furthest away from the surface of the ovary; the deeper ones always appear to begin to mature first.

Fig. 3 marks an important stage in the maturation of the Graafian follicle. It shows a further proliferation of the now well-marked membrana granulosa, the formation of a zona pellucida (zona radiata) to the ovum, and the appearance of a well-marked fibrous tunic to the Graafian follicle. The membrana granulosa, mostly two-layered, consists of cubical cells whose bodies are still inconspicuous, and whose nuclei are elongated in a radial direction. The zona radiata of the ovum appears to be incompletely formed, and has on its outer surface small pointed projections which extend between the cells of the membrana granulosa. The ovum measures ·065mm. in diameter and the nucleus ·025mm. in diameter. The follicle is now obviously larger than the ovum, and measures ·115mm. in diameter. The fibrous tunic of the Graafian follicle appears to be forming, and is obviously a concentric arrangement of the ovarian stroma cells which surround the follicle. There are no obvious blood-vessels in the fibrous tunic.

Fig. 4 shows general enlargement of the follicle due to the great proliferation of the cells of the membrana granulosa. These cells have the same character as before, and here and there among them can be seen spaces filled with coagulated material which no doubt represent the commencement of the formation of liquor folliculi, apparently appearing at four or five places among the cells. The follicle now measures ·18mm. in diameter, the ovum has increased

to ·075mm. in its longest diameter, and the nucleus remains at ·025mm. in diameter. The zona radiata is the same thickness all round, and shows similar pointed projections to those shown in the last fiure. The fibrous tunic in this particular specimen is not very well marked.

Fig. 5 shows great enlargement of the follicle owing to the formation now of a large quantity of liquor folliculi, great proliferation of the membrana granulosa, and a well-marked discus proligerus. The cells of the membrana granulosa now have more obvious cell bodies. The follicle now measures ·39mm. long by ·33mm. broad, the ovum ·09 × ·075mm., and the nucleus ·03 × ·025mm. The pointed projections on the zona radiata are still seen.

Fig. 6 shows still more enlargement of the follicle, the liquor folliculi being relatively greater in amount, the cells of the membrana granulosa proliferated still more and thinned out on the side away from the discus proligerus. The follicle now measures ·8 × ·7mm., the ovum ·1 × ·095mm., and the nucleus ·03mm. in diameter. This ovum apparently has reached the maximum size found in children's ovaries, at all events it is the maximum size found and measured in this series of specimens. As the mature human ovum from an adult is stated in text-books to measure about ·2mm., it would seem that the ovum in præ-menstrual life does not reach the same size as it does in adults; this no doubt might be expected. The cells of the membrana granulosa in this specimen have well-developed cell bodies. The fibrous tunic is well marked, but does not materially differ from the ovarian stroma around except that more blood-vessels are seen in it than is commonly seen in the ovarian stroma. This marks the commencement of that vascularity which will give rise later to a species of granulation tissue. This Graafian follicle may be taken on the average as the size of the mature follicle in præ-menstrual life, and at this point in general retrograde changes begin. However, at this stage it appears that there is often an excessive amount of liquor folliculi produced, giving rise to such an enormous enlargement that the size of 5mm. in diameter or more may be reached. In these larger follicles no further development of the ovum is found, and the appearance of the ovum and discus proligerus remain the same, the only difference being that the membrana granulosa becomes more and more thinned out on the side away from the discus proligerus, and may be represented by a single layer of cells only. The proof that these very large follicles are physiological and not pathological has not been absolutely made out in this research, but it seems more than

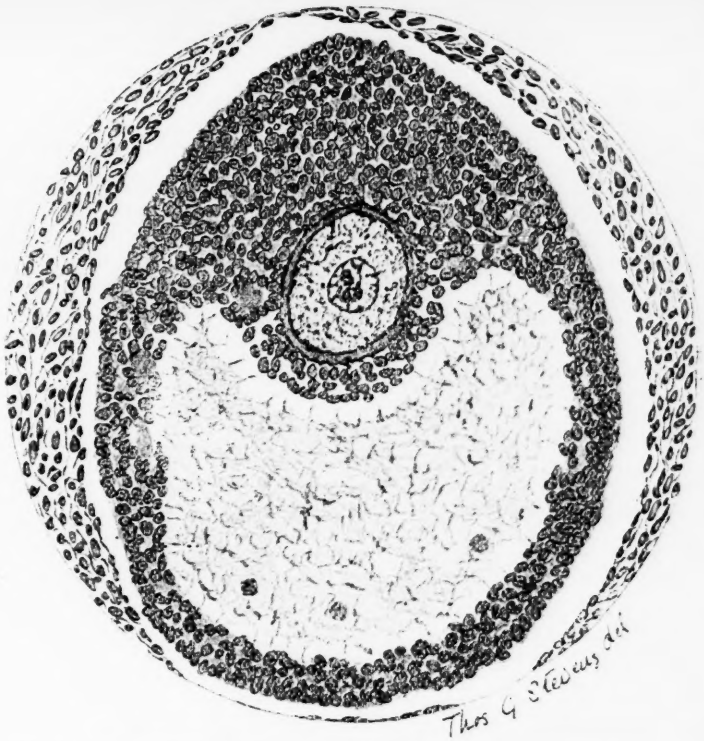

FIG. 5. Enlarging Graafian Follicle. Liquor Folliculi. Discus Proligerus. ×280.
Ovum measures ·09 × ·075mm. in diameter.
Follicle measures ·39 × ·33mm. in diameter.

FIG. 8. Retrograde changes. Invasion of Ovum by Phagocytic Cells. ×270.
Membrana Granulosa breaking up.

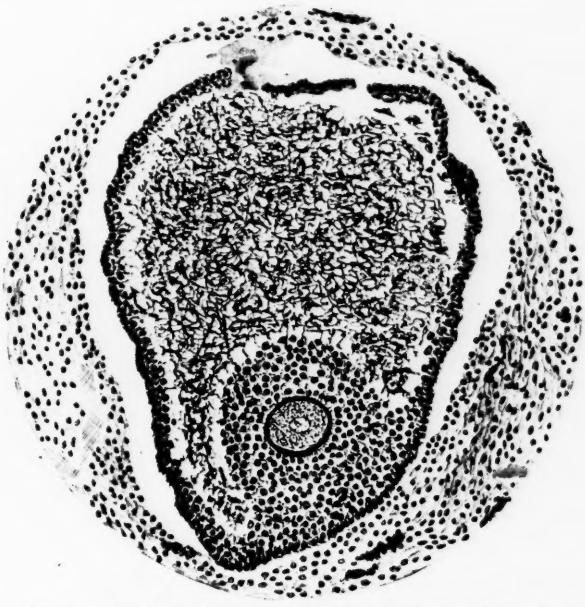

FIG. 6.—Fully formed Graafian Follicle and Ovum. ×100. Ovum measures ·1×·095mm. Follicle measures ·8×·7mm.

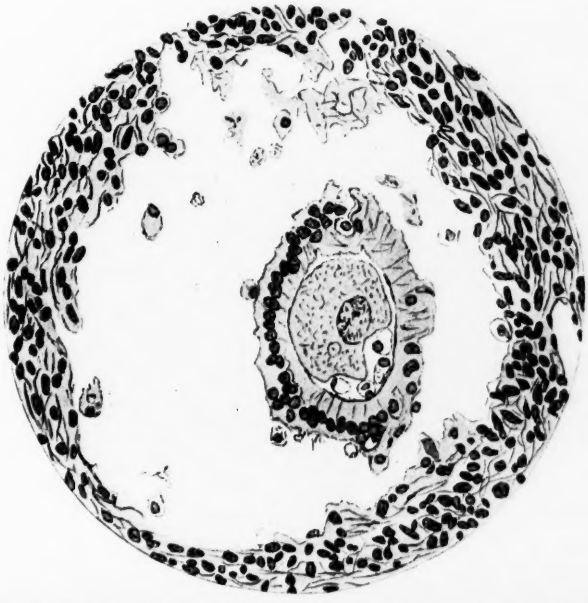

FIG. 7.—Retrograde change. Invasion of ovum by Phagocytic cells. ×310. Disappearance of Membrana Granulosa. Follicle measures ·23mm. in diameter.

FIG. 9.—Retrograde changes. Ovum, phagocytic cells, contracting Graafian follicle, granulation tissue. ×73.

FIG. 10.—Retrograde changes. Commencing granulation tissue in fibrous tunic; very large blood vessels. ×75.

probable. These large follicles show the great vascularity of the fibrous layer, and sometimes show definite commencement of granulation tissue. The largest contracting follicle measured is shown in Fig. 12, and measures 1·1mm. in its longest diameter. It may be confidently supposed that contraction occurs very rapidly, and so this follicle must have been considerably larger than 1·1mm. in diameter when at its greatest size before contraction began. In any case it must have been much larger than the mature follicle shown in Fig. 6. Not uncommonly retrograde changes begin in follicles smaller than that in Fig. 6. For instance, in Fig. 7 retrograde changes are obviously well advanced because the ovum is being destroyed by phagocytic cells, and yet the follicle only measures ·23mm. in diameter. In some of the specimens even smaller follicles than this can be seen undergoing retrograde changes.

Retrograde changes. These must be described, as they affect the ovum, the membrana granulosa, and the wall of the follicle. The ovum can generally be recognised in the contracting follicles if sufficient serial sections are cut. Fig. 7 shows the commencement of the invasion of the ovum by cells which appear to act as phagocytes. In this specimen the zona radiata is closely beset on one side by cells of the membrana granulosa, and appears to be thicker than usual. In disintegrating ova as a rule the zona radiata appears to be thicker than usual as if it were swollen by imbibition of some fluid substance. This is shown in Figs. 7, 8, and 9. In the ovum itself of Fig. 7 there are four cells to be seen which appear to have destroyed a part of the ovum itself, a lunated outline of the ovum abutting on these cells. The ovum is shrinking away from the zona radiata all round. The zona radiata appears to be the most resistant part of the ovum, for in most of the specimens observed it seems to be the last part of the ovum to be completely destroyed, and retains its staining powers a long time after the main body of the ovum is disintegrated. Fig. 8 shows a somewhat similar condition, but here the change has advanced further, as the interior of the ovum is entirely occupied by these invading cells, seven in number. The next section in series on this slide shows how these invading cells have got into the ovum. The zona radiata is deficient at one side, as if it had been broken down by these cells, and then, as it appears to be very resistant, more cells have passed in through the same opening instead of destroying more of the zona radiata. In some specimens only the zona radiata can be seen, both the ovum and the invading cells apparently having disappeared. It may be argued, on the other hand, that these apparently phagocytic cells are not so

in reality, but are simply granulosa cells which have been ingested by the ovum. This process has been shown to occur in some animals and is connected with the building up of the ovum rather than with retrograde changes. The present view is based largely on specimens 7, 8, and 9, and especially 7. The lunated outline of the ovum in No. 7 strongly suggests a hollowing out process by these cells, and certainly seems opposed to the view that the cells are simply ingested, for in that case the ovum would be expected to increase in size—which is not the case here. Again the phagocytic view is upheld by the large numbers of cells which seem to be passing into the ovum in specimens 7, 8, and 9 through a single opening in the zona radiata. The invading cells have uniformly similar characters wherever they are seen. They have spherical bodies ·01mm. in diameter on the average, their protoplasm is vacuolated as if they were swollen up with drops of fluid, and their nuclei are slightly oval and apparently absolutely identical with those of the cells of the membrana granulosa. The nuclei of these cells are generally displaced to one side as if crowded out by the vacuoles. The origin of these cells is a question of great physiological interest, because all the appearances point to their identity with the cells of the membrana granulosa. There are two possibilities with regard to their identity—they may be membrana granulosa cells or they may be leucocytes. With regard to the second possibility these cells are quite unlike any of the usual forms of leucocytes, either the polynuclear, the lymphocytes, or the eosinophiles. The character of the nucleus is the chief determining point in this, because with regard to size of cell body there is not much difference. If these cells are leucocytes there should be some evidence in the sections of diapedesis as showing the origin of them from the capillary vessels; but a prolonged search has not shown a single place where a leucocyte can be seen emerging from a vessel. On the other hand, the nuclei of these cells are identical in appearance with those of the cells of the membrana granulosa, and in many specimens these cells can be seen among those of the membrana granulosa, various sizes being present as if the essential change was simply one of swelling of the cell body from ingestion of fluids. From these considerations it appears that these cells really are identical with those of the membrana granulosa. There is no reason why the cells of the membrana granulosa should not take to themselves the properties of phagocytes; every recent research points to the fact that it is not only the white blood cells which exert phagocytic powers, but that others, such as the endothelial cells of blood-vessels, may have the

same properties. All these cells owe their common origin to the mesoblast, and from our knowledge of the transmutation of epithelial cells it must be admitted that it is at least possible for the cells of the membrana granulosa to become phagocytes. In some follicles very large numbers of these cells are seen, all having the same characters; they cannot all take part in the destruction of the ovum, and it must be said that the functions exercised by these large numbers of cells are by no means clear. It may possibly be that they absorb some constituent of the liquor folliculi. The ultimate fate of these cells is clear in the sections. They undergo necrobiosis, the nuclei gradually lose their staining powers, the cell bodies lose their distinct outline, and eventually they break up and no doubt are absorbed by the granulation tissue of the fibrous layer of the follicle. All stages of disintegration of these cells can be seen in the sections. In some of the sections the ovum seems to undergo necrobiosis without invasion by the cells of the membrana granulosa, but as a rule one or two solitary cells can be seen in the ovum. The first method is without doubt the common one by which the ovum is got rid of.

The fate of the membrana granulosa will be partly gathered from what has been already said, but all its cells do not give rise to these swollen phagocytic cells. Many of the cells of this layer disintegrate without any further change, and fragmentation of the nucleus, loss of staining properties, and general break up of the cell seems to be the fate of the majority. The first noticeable change in this layer as a whole is a shrinking away from the fibrous tunic of the follicle, thus losing its supply of nutriment. Then some of the cells become phagocytes, and others simply break up. In any case, before much contraction occurs in the follicle nearly all the cells of the membrana granulosa have disappeared.

The fibrous tunic of the Graafian follicle, which has been already shown to be but little marked in the earlier stages of development, later undergoes a well-marked series of changes which result in the formation of a kind of granulation tissue. The first change noted is increase of capillary blood-vessels in the fibrous coat, sometimes to a remarkable degree. This is well shown in Fig. 10, which is a drawing of a follicle measuring 1·2 × ·64mm., in which the membrana granulosa is shrinking away from the fibrous wall. Along with this increase in the vessels there is a proliferation of the connective tissue cells in the fibrous tunic, the whole producing a richly cellular, very vascular tissue extending equally all round the follicle. This layer is easily distinguished from the membrana granulosa by

the presence of so many vessels in the former, while there are none in the latter. This layer rapidly increases in thickness and the blood-vessels form definite capillary loops such as one constantly associates with granulation tissue. Between the capillary loops the cells arrange themselves in a more or less radiating manner with their long axes at right angles to the wall of the follicle. This tissue is well shown in Fig. 9; the great thickness of this tissue and the fairly sharp line of demarcation between it and the ovarian stroma is obvious. At the same time what may be termed the "indifferent layer" develops on the surface of this tissue towards the follicle. Apparently this layer consists of coagulated lymph thrown out from the blood-vessels and in it new connective tissue begins to form in the follicle. Fig. 9 is also interesting because it shows, in addition to the granulation tissue and contraction of the follicle, the ovum full of phagocytic cells, and the production of new fibrous tissue; all these changes going on at the same time.

Fig. 11 shows very well a portion of one of the capillary loops with the radiating cells and new connective tissue forming inside the "indifferent layer." The whole follicle at this stage in shown in Fig. 12, which is a drawing of a follicle measuring 1·12 × ·83mm. Here can be seen the granulation tissue, "indifferent layer," and new delicate connective tissue forming inside the follicle and gradually filling it up. The projection into the follicle is no doubt a spur of granulation tissue and ovarian stroma, apparently formed by a doubling in of the follicle wall, probably from pressure. In this particular follicle there seems to be nothing much left to absorb except some coagulated fluid left after the membrana granulosa has disintegrated. From this time the follicle fills with connective tissue, upon which the granulation tissue gradually encroaches, compressing it and possibly reabsorbing some of it, so that still later the follicle presents the appearance shown in Fig. 13. Here the granulation tissue can be still recognised in places, the "indifferent layer" can be seen, and the compressed scar tissue inside is obvious. Three large swollen cells can be seen in the drawing which are no doubt some phagocytic cells which have not yet disintegrated. The blood-vessels now are not so numerous, they have apparently done their work, and seem to have contracted from pressure of scar tissue..

The final result of the process is a small knot of scar tissue which can easily be recognised, but which is of variable size, possibly depending on the original size of the follicle at its maturity. In Fig. 13 the follicle only measures ·26 × ·21mm. Scars of this size

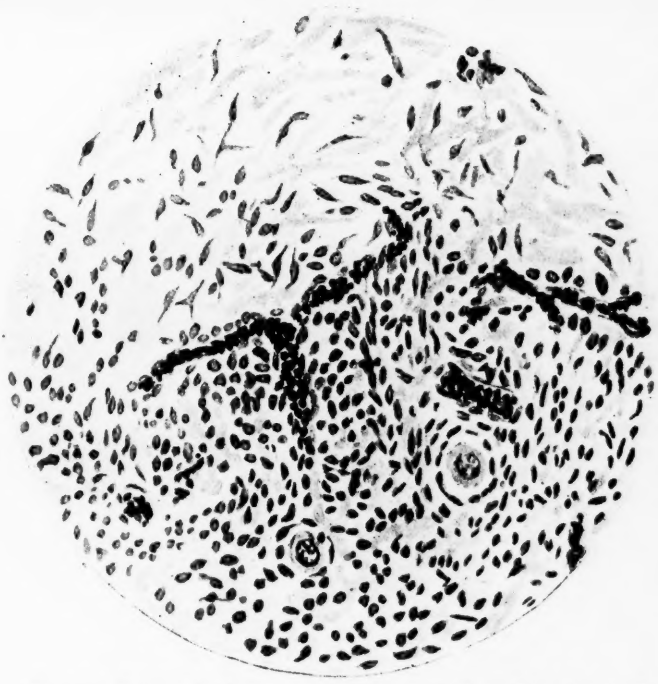

FIG. 11.—Retrograde changes. Capillary loop in Granulation tissue of contracting follicle. New fibrous tissue filling up follicle. ×280.

FIG. 12.—Retrograde changes, contracting follicle, granulation tissue, new fibrous tissue. Follicle measures 1·2mm. ×·64mm. ×62.

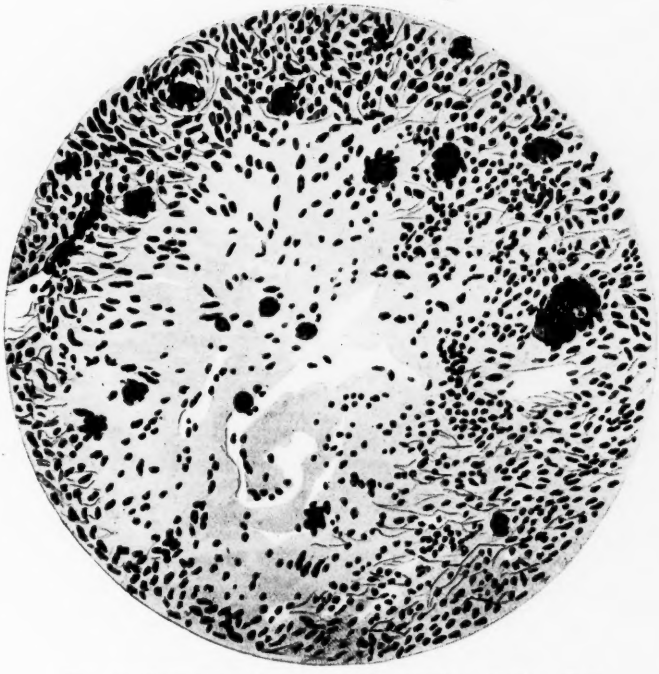

FIG. 13.—Retrograde changes. Nearly complete cicatrix. Four phagocytic cells not yet absorbed. ×280.

FIG. 14.—Ovaries with many large follicles. ×3.

can be seen in all children's ovaries, but when further contraction occurs there may be some difficulty in recognising these structures. Small corners cut off larger scars might easily appear as final results of cicatrisation, so that it is important to carefully examine serial sections before arriving at a decision with regard to the smallest scars. In general these scars leave no trace on the surface of the ovary, but it is not uncommon to find slight infolding of the surface. When this occurs it probably means that the follicle was much larger than usual before contraction began. The two sections of ovaries shown in Fig. 14, which are drawn three times their natural size, could hardly be expected to show no infolding of the surface when such large follicles contracted. There is no doubt that when such large follicles are found the retrograde changes are postponed for some reason, and the large size is due to great development of liquor folliculi. Beyond this pouring out of fluid there is no evidence of a pathological change. In none of the 70 pairs of ovaries examined was there any evidence of an adenomatous transformation. A very large proportion of these ovaries contain follicles from 2—3mm. in diameter, and from this frequent occurrence it cannot be supposed that they are in any way pathological, especially as many of them already show commencing granulation tissue in their walls preparatory to contraction and absorption.

It is interesting to speculate as to the reason for this series of changes in the ovaries of infants.

In the present state of our knowledge of the functions of the ovary we are forced to conclude that this organ plays a dual rôle, namely, that of supplying the female sexual cells and the production of some internal secretion which is essential to the wellbeing of the female up to a certain age. It is clear that the supply of sexual cells is unnecessary in infants, and so the follicles do not burst, but it is not certain at all that the internal secretion is unnecessary. In all probability this plays an important part in the development of the female child. It may be conceived that these constant changes in the Graafian follicles are in some way the source of this internal secretion. At present, however, we have no evidence to offer in favour of this, and it must remain but a most fascinating theory.

The drawings illustrating this paper have been made from different ovaries, irrespective of age; but it must be understood that all the changes described may often be seen in the same ovary, and the ovaries of a child of one year may show them just as well as those of an older child. The drawings have all been made with a Zeiss Camera Lucida.

Conclusions:—

1. The Graafian follicles and ova in præ-menstrual life mature by a constant well-marked series of changes.

2. The ovum never reaches the same size as that of an adult female.

3. The size of the correspondingly mature Graafian follicle is variable, but usually measures about ·8—1mm. in diameter.

4. The ovum is removed by a kind of phagocytosis as a rule, but may undergo simple necrobiosis.

5. The phagocytic agents are the cells of the membrana granulosa.

6. The follicle eventually contracts by means of granulation tissue formed in its fibrous tunic, which eventually absorbs the remains of the membrana granulosa and liquor follicles.

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Case of Cæsarean Section performed three times upon the same Woman.

By W. J. Sinclair, M.D., *Professor of Obstetrics and Gynæcology, Victoria University of Manchester.*

This case is, as far as I can learn, so far unique in the history of British obstetrics, and for that reason alone it may be considered worthy of record. In the admirably clear and complete account of Cæsarean Section under modern conditions given by Dr. Arthur J. Wallace in this journal (See *Journal of Obstetrics and Gynæcology of the British Empire*, Vol. ii., p. 555), no British case in which the operation has been done three times successfully is mentioned; and Dr. Wallace, who is still watching the literature of the subject, informed me recently that no case has been published since the date of his paper. Success in this case was complete in every respect; the mother not only made a very good recovery from her third operation, but all the children survived.

The first operation was performed on the 10th of April, 1896, and the case was described in detail in the *Medical Chronicle* in July of the same year. Cæsarean Section has received so much attention throughout the civilised world during the last ten years, and so many questions, debated in the earlier years of the period, are now practically settled, that there can be no advantage in giving certain details of any given case which were then of practical interest. It is only intended, therefore, to recapitulate here the facts which must remain of perennial interest in cases of Cæsarean section, and to call attention more particularly to points that derive importance from their bearing on unsettled questions. These are chiefly the time of operation in relation to the onset of labour, the formation of adhesions, and the possibility of operating a second time without appearing to open the peritoneum, the question of "sterilisation," the danger of rupture of the uterus in subsequent pregnancies, and some minor points to be referred to incidentally.

The patient was admitted to the Manchester Southern Hospital on the 10th of April, 1896. She had been visited that morning by a midwife, who at once sent her to the hospital. M. A., a primipara, was said to be married. She was in a physical sense probably the most remarkable married woman in England at the time. On examination the abdomen was found to be very prominent with the fœtus entirely above the brim, with the head in the right iliac fossa. The conjugate diameter was just about two inches; the membranes

were protruding; the os soft and well dilated; but no part of the fœtus presented. The external genitals were swollen and congested. The patient was extremely deformed, the most striking feature of the deformity being ankylosis of the left hip-joint with flexion of the left thigh upwards and inwards, so that the knee pressed upon the abdomen. There was extreme lordosis, the hips and shoulders only supporting the body on the operating table. Patient was of small size; her head was flattened downwards as if she had suffered from marked rickets before the hip-joint disease came on; she had lost one eye, and her teeth were extremely defective. It became evident subsequently that her intelligence was of a rather low order.

The operation of Cæsarean section was performed about twelve hours from the onset of labour pains. There had been comparatively few vaginal examinations before the patient's admission to the hospital. The abdominal wound was made unusually high owing to the difficulty caused by the lower extremity pressing against the abdomen. The uterine incision was made without "eventration." During the extraction of the fœtus, the manipulations were rendered awkward by the mother's limb, and some laceration occurred at the lower end of the wound. The uterus, as soon as emptied, was drawn forward and an elastic tube was, as in previous and subsequent cases, passed round the narrowest portion about the isthmus to arrest hæmorrhage. The wound in the uterus was closed by deep silk and superficial catgut sutures without regard to seizing or avoiding the decidua; they were all so inserted as to take a large hold of the tissues, and they were drawn tight before tying in order to make allowance for the contraction and involution of the uterus. Much care was bestowed upon the suturing of the lacerated portion. A glass drainage tube was inserted in the lower angle of the abdominal wound and directed down towards the left where there was something like a pelvic cavity. The tube was left for only twenty-four hours. This was the last case in which drainage has been employed in Cæsarean section at the Southern Hospital. The mode of closing the abdominal wound and the dressings call for no remark.

The child was vigorous from the first, showing no sign of asphyxia. It was a fully developed male, weighing seven pounds and a quarter at birth, and nine pounds and a quarter when the mother was discharged from the hospital.

The convalescence could not be described as "smooth." There were never any puerperal symptoms. Involution was slow, but the lochia remained normal from first to last. Healing of the abdominal wound was exceptionally tedious. In the early stage after operation

there was some broncho-pneumonia from the anæsthetic; and later an abscess formed above the sacrum from pressure. On the second day the highest temperature and pulse were 101° and 140. On the third day the highest temperature and pulse were 103° and 140. On this day there was sugar in the urine, but no sign of milk in the breasts. On several subsequent days a trace of sugar was found in the urine, but there was never any fulness of the breasts.

On April 15th, at 2 p.m.—that is to say exactly five days from the completion of the operation,—the temperature was 104°, the pulse 130, and the respirations 37. Cough troublesome. The symptoms gradually improved from this time, but the temperature rose a fortnight later, and "an abscess over the sacrum" was opened by the house-surgeon on the 30th of April. From that date there was nothing to record. Inquiries made during the later stage of convalescence revealed a remarkable history of illness from the age of five years; residence in hospitals off and on for years; discharge repeatedly as incurable; excision of left hip-joint in Crumpsall Workhouse Hospital in the course of a three years' residence there; then the display of ignorance and apathy at home which permitted the ankylosis at the hip and flexion of the limb across the abdomen, and the extreme curvature of the spine. The right leg was sufficiently well-formed to enable the patient to walk with the aid of a crutch.

More exact measurements of the pelvis were made before the patient went home. The distance between the iliac crests was $9\frac{1}{4}$ins., between the anterior iliac spines 9ins.; the external conjugate was 5ins., and the true conjugate 2ins. During this last examination it was ascertained that the uterus was adherent to the abdominal parietes just as after ventrifixation.

Second Operation.

The patient presented herself again at the Southern Hospital at the beginning of August, 1901, when she was fully eight months pregnant. The abdomen presented much the same appearances as on the first occasion, with the addition of an irregular but firm cicatrix marking the former incision, the result of the unsatisfactory process of healing. She mentioned that she had a miscarriage at 4 months in 1899. She was quite comfortable, and had been so during the whole pregnancy, with the usual amount of sickness, but with no discomforts or dragging beyond the normal. Owing to vague fears on my part that the uterine cicatrix might be as unsatisfactory as the abdominal, and that consequent danger of rupture might exist, without any evidence to that effect, it was resolved to

have the patient under observation; so she was admitted to the hospital on the 14th of August.

Careful examination led to the conclusion that there was extensive and firm adhesion of the uterus to the abdominal wall; it was consequently hoped that the uterus might be opened and the fœtus and secundines extracted without opening the peritoneal cavity. As the fœtus appeared to be well developed and vigorous, lying entirely above the true pelvis, and the abdominal tumour was beginning to press too high up, and as the *bogey* of rupture of the uterus was still present, it was resolved to proceed with the operation before labour pains began.

Operation on August 22nd, 1901. Under chloroform anæsthesia an abdominal incision was made along the cicatrix left by the former incision. When the sub-peritoneal tissue was reached great care was taken in the further dissection, the resistance of the tissues especially above and below being constantly tested. An incision estimated to be sufficient for the extraction of the fœtus was next made down to the muscular tissue of the uterus. Traces on the uterus of the former operation were searched for in vain. The uterine wall was found to be of the normal appearance and resistance, and the wound was prepared for the final rapid incision of the uterus without any opening of the peritoneum. Just at the critical moment the patient began to vomit, and the wall of the uterus bulged forward as if it would burst. The wound of the uterus was rapidly finished as it had been already begun, and the fœtus with other contents extracted. Similar difficulties were met with as at the first operation owing to the position of the flexed limb, which could only very partially be raised by reason of the ankylosis at the hip. The uterus contracted under firm pressure from above and at the sides. It was then found that a small opening into the peritoneum, sufficient to admit the tip of the index finger, had been made at the lower angle of the wound on the right side. It had evidently been produced by the strain of the vomiting at the last moment. It was too small to permit of the entrance of fluid from the uterus into the peritoneal cavity. The wound in the uterus was closed by means of ten deep sutures of fine silk and six superficial sutures of catgut. The external wound was sutured in stages partly by splitting the margins where the cicatrix appeared to be too thin.

There is little worthy of mention during convalescence. Some hæmorrhage from the vagina for a few hours after the operation, then scanty but otherwise normal lochia. No blood-clot passed at any time. Sugar in the urine the day after operation and sub-

The photograph shows the rough, irregular cicatrix, and the position of the left knee. There is no hernia, but the skin still discoloured where the knee pressed and rubbed before operation.

sequently. Temperature rose to 100·4 on the third day, after that at or about normal. Pulse remained rather quick (100 to 112) for seven days, then slowed down to the ordinary rate. Milk appeared on the fourth day, and the child was put to the breast subsequently in the daytime. No mention is made in the notes of the sex and weight, etc., of the child. "Recovery splendid" is the final surgical note by the house-surgeon concerning the mother. When leaving the hospital on September 17th, "both mother and child looked well."

Although no labour pain had occurred at the time of operation the uterus contracted perfectly, and there was no need to interfere with the cervix in order to obtain perfect drainage. No vaginal examination had been made before operation, but in this case as in all others the vagina was thoroughly cleansed immediately after the surgical proceedings of the operation by swabbing and rubbing with suitable portions of cotton-wool soaked in 1:1,000 hot solution of corrosive sublimate. After that only external antiseptic pads were used. The pain of the wound was soothed by small doses of morphia hypodermically. No ergot was administered. The bowels were relieved by one-grain repeated doses of calomel begun to be administered on the second day.

THIRD OPERATION.

June 23rd, 1903. Patient came into the Southern Hospital in labour about 11 a.m. Arrangements had been made for her admission a fortnight later with the object of operating again before the onset of labour, but she had made a miscalculation. The pains came on during the previous night, but she mistook them for the effects of a dose of aperient medicine, and took her time. When she was admitted to the hospital, although the operation had been all arranged for, the house-surgeon of the day proceeded, with superfluous zeal, to make a conscientious vaginal examination, and sent a message two and a half hours afterwards to the effect that he judged the patient to be in labour. When visited just before two o'clock the abdominal examination showed that the fœtus was alive and well developed, with the head in the right iliac fossa and the body obliquely transverse. As the labour pains were very severe a full dose of morphia was administered to keep them moderate until assistance could be obtained and the necessary preparations made. Operation about 4 p.m.

Incision made, as on former occasion, through a very hard and irregular cicatrix under the same difficulties, owing to the position of the left leg. It was hoped that this time there would be no opening

of the peritoneal cavity, but the sequel was disappointing. With all the former precautions the muscle of the uterus was reached, and as before no trace of a former operation could be found. Owing to the position of the fœtal head, and the oblique position of the uterus in consequence, the incision of the uterus was not sufficiently deflected to the right, and an opening sufficient to admit a very small sponge was made into the peritoneal cavity. The child (female), when extracted, was slightly asphyxiated, but soon screamed lustily. It appeared to be at full term but was small. No note of weight or length at time of birth. The uterus did not readily contract, and there was a fair amount of hæmorrhage before it responded to stimulation by sponges within and pressure without. The opening into the peritoneal cavity was probably more of a disappointment to the operator than an injury to the patient. The wounds in the uterus and abdominal wall were closed in much the same way as before. Thorough swabbing of the vagina to finish. External pad only.

Of subsequent incidents there is again little worthy of mention. Pain required for relief two small doses of morphia hypodermically within first 18 hours. Slight hæmorrhage for a few hours. Discharge blood-stained and slimy on third day. No clot ever passed. Vaginal douching from third day for several days. Temperature gradually rose to 101·2 on the third day then gradually subsided and was normal by the eighth. Pulse rather quick for first six days, though seldom over 100. Sugar appeared in the urine on the fourth day after operation, and next day there was sufficient milk to partly nourish the child. The abdominal wound was slow in healing as on former occasions, and the patient remained in the hospital until July 20th. The child weighed 6lbs. 12ozs. when 16 days old, and 7lbs. on the 26th day; but it appeared to be well when last seen.

It is not my intention to explicitly discuss the questions which rise to the surface on the perusal of such a story. On the question of "sterilisation" it should be remembered that if it is not effected by some addition to the first operation it becomes a dangerous complication of the proceedings to break down adhesions in order to get at the tubes if a second operation is required. With regard to adhesions, my belief is that a subsequent operation becomes safer in proportion to the firmness and extent of the adhesions. It has therefore been my practice to try to produce adhesions of the uterus to the parietes. In this case as in the others in which pregnancy occurred after Cæsarean section, there have been no symptoms which could be attributed to the adhesion of the uterus to the abdominal wall.

My impression is that convalescence has been most favourable in the cases operated upon before the onset of labour.

Hypertrophy of the Fœtal Thyroid with Maternal Eclampsia.*

By W. E. Fothergill, M.A., B.Sc., M.D., *Assistant Physician to the Northern Hospital for Women and Children; Lecturer in Obstetrics in the Owens College; Director of the Clinical Laboratory, Royal Infirmary, Manchester.*

The case now reported presents two features of interest which I am inclined to regard as quite independent of one another. In the first place, it affords an example of the use of thyroid substance in the management of eclampsia. Secondly, it is one of the five recorded instances of hypertrophy of the thyroid gland in the child following the administration of chlorate of potassium to the mother during pregnancy. Both these matters have recently been considered by the Obstetrical Socity of Edinburgh.

Mrs. D., aged 37 years, is a short, stout lady, of gouty Derbyshire ancestry. She had a sister who was mentally defective, and died of diabetes; the other members of her family are normal. Her husband's personal and family history are also normal. The patient began to menstruate at the age of 12 years, the function being regular, but accompanied by violent pain. At the age of 18 years she had various manifestations of gout, but her dysmenorrhœa was relieved for a time. In the year 1892, being then 27 years of age, she married, and at once went abroad. She then consulted a number of American and Colonial medical men in various places on account of her dysmenorrhœa, and suffered much from a variety of diagnoses and treatments. She was said to have prolapse, for which pessaries were used; she was curetted, and was once kept on her couch for seven months. She had two early abortions, and a third pregnancy ended at the fourth month in May, 1899. She was wearing a Hodge pessary at this time. She menstruated regularly until November 30th, 1901, when her fourth pregnancy began. Three months later she had an incomplete abortion, followed by a sharp sapræmic attack. I then saw her for the first time, and removed the infected *débris* of the ovum. A month later I found the uterus normal in size, anteverted, slightly anteflexed and lying rather low in the pelvis. Her Hodge pessary had been replaced, and at her own wish she continued to wear it. She menstruated on April 14th, 1902, and then became pregnant for the fifth time. I saw her a month later, and insisted on removing the pessary, instructing her to support the uterus during the day if necessary by putting one or two small sponges in the vagina. She professed to derive great

* Communicated to the Edinburgh Obstetrical Society, December 9th, 1903.

comfort from the sponges during the early months, and stated that if she omitted to insert them pain and discomfort soon began. Thinking it probable that the repeated abortions were due to placental thrombosis, I prescribed as follows:—

R.	Pot. Chlor.	ʒii.
	Tr. Ferri Perchlor.	ʒii.
	Glycerine	ʒss.
	Inf. Quass. ad.	ʒvi.
Sig.	ʒss. t.i.d. ex. aqua. post. cib.	

This was taken throughout pregnancy, which continued undisturbed, the general health being excellent. The urine was examined several times, the last occasion on which it was quite normal being December 3rd, 1902. The patient's thyroid gland, it should be noted, appeared to enlarge to about the usual extent during this pregnancy, but her stoutness rendered difficult any very accurate estimate of its increase.

On December 7th there was slight swelling of the hands and feet, and on the 16th the urine contained 0·2 per cent. of albumen. The patient was ordered to rest on her couch, to confine herself to vegetarian diet, and to take two five-grain tabloids of thyroid substance daily. On December 25th she had a slice of goose and a "crumb" of plum pudding, and the next day was not well. On the 27th she remained in bed suffering from headache and vomiting. On the 29th she passed no urine during the day, and the sickness and headache were worse. In the evening a nurse was sent for, but before she arrived two prolonged and violent eclamptic seizures occurred. At midnight the patient was semi-comatose. There was no sign of labour. Half a grain of morphia was injected, and heat was applied by means of hot-water bottles until profuse perspiration occurred. On the 30th she was drowsy and restless, but spoke and swallowed. Vision was impaired. No urine had been passed. Lavage of the rectum was practised, and during the next 24 hours the patient was given three grains of calomel and nine five-grain tabloids of thyroid substance. On the 31st the condition remained unchanged. Rectal lavage was repeated. Seven tabloids of thyroid were given during the day. Urine was passed in the evening, and the condition improved, the patient taking milk and drinking water freely. The improvement was maintained on January 1st. During the afternoon labour began, and at 9 p.m. the head was at the vulva. About an hour later, a little chloroform having been given, the tough perineum was incised on each side after the forceps had been applied to the head. A small female child was then easily delivered. It cried freely immediately, and some venous distension in the neck at once became visible. After the mother had received attention, examination of the child revealed the presence of a large solid tumour representing the whole of the thyroid gland. This was covered by an enormously dilated venous plexus. The head and neck became more and more intensely congested, and it

became clear that the circulation, as demanded by pulmonary respiration, could not be established. The child died a few minutes later.

For 24 hours after the completion of labour there was complete anuria, but $1\frac{3}{4}$ pints of urine was passed late at night on January 2nd. During the day the temperature had been normal, and the pulse-rate 140. Thyroid substance was given to the extent of 30 grains. On the 3rd the urine passed amounted to five pints. After 15 grains of thyroid had been given the administration of this substance was stopped. The temperature was normal, the pulse-rate 150. On the 4th the pulse-rate fell to 110, and the urine again amounted to five pints. During the next few days the patient's condition gradually became normal.

In the table that follows the urine described for each date was collected during the 24 hours, ending at about 9 p.m. on that date, and not at midnight, as it, strictly speaking, should have been:—

	Quantity in pints.	Specific Gravity.	Urea in grains per ounce.	Albumen.	
Dec. 16	$4\frac{1}{2}$	1007	3	·2%	
„ 19	$4\frac{1}{2}$	1008	3	·4%	
„ 21	$3\frac{1}{2}$	1010	$3\frac{1}{2}$	·45%	
„ 28	$3\frac{1}{2}$	1020	8	·8%	
„ 29, 30 and 31	—	—	—	—	48 hours' anuria.
„ 31	$2\frac{1}{2}$	1010	3	·8%	
Jan. 2	$1\frac{3}{4}$	1010	6	·8%	After 24 hours' anuria.
„ 3	5	1010	6	2·0%	Bile pigment.
„ 4	$4\frac{1}{2}$	1010	$7\frac{1}{2}$	1·3%	Blood and bile.
„ 5	$4\frac{1}{2}$	1010	6	·28%	Blood.
„ 6	$4\frac{3}{4}$	1010	5	·25%	
„ 8	4	1010	6	·2%	
„ 14	3	1020	$9\frac{1}{2}$	·1%	
„ 20	$2\frac{1}{2}$	1015	7	·05%	
„ 28	3	1010	$4\frac{1}{2}$	·05%	

Post-mortem on the Fœtus. The liver was very large. The head of a femur was divided, and was perfectly normal. When incision was made in the middle line of the neck an enormous quantity of dark, thick blood escaped. The neck and face, which had been very congested, assumed the ordinary colour of a dead baby. To get at the tumour it was necessary to burrow through a thick mass of large blood-vessels, a sort of venous plexus or almost an angioma. The thymus was normal. The thyroid was removed together with the larynx and a few rings of the trachea and the corresponding part of the œsophagus. On carefully dissecting away everything but the gland the weight was reduced to 25·8 grammes. The photographs are natural size and show anterior and posterior views. (See Figs. 1 and 2.) The

two lobes were almost equally developed, and the isthmus formed a rounded mass nearly equal in size to one of the lobes. The lobes embraced the trachea larynx (the thyroid is high up in the fœtus) and œsophagus, almost meeting each other behind the latter. The photograph shows their position slightly separated by dissection.

Sections were made of a portion of one lobe, and as the tumour is quite uniform in consistence the appearances of these sections probably give correctly the histology of the whole. The sections show masses of glandular tissue of varying size, separated by septa of well-formed connective tissue. The blood-vessels are large and numerous. The gland tissue presents a very complex arrangement adenomatous in type. The lumina of the spaces are very small, very complex in outline, and between the layers of epithelial cells lining them there are massed epithelial cells. There is not any colloid material in any of the spaces, and it was remarked when cutting the sections that the tissue did not behave towards the knife in the unkind manner characteristic of thyroid gland. The enlargement of the organ appears to be due to overgrowth of all the tissue elements, especially the glandular elements. There is no suggestion in the appearance of the tissues of any inflammatory process having occurred. The specialisation of the gland has, however, been considerably retarded, for there is in the normal thyroid at birth a considerable amount of colloid substance. The weight of the normal thyroid at birth I find, by repeated observations, to vary between 1 and 2 grammes. Supposing its average weight to be 1·5 grammes, the hypertrophied gland now described therefore weighs about seventeen times more than the normal gland should do. (See Figs. 3 and 4.)

For the student of puerperal eclampsia the case described above is simply an experiment in the use of thyroid substance as urged by Dr. Nicholson. The table of urinary analyses certainly shows that the renal excretion improved before the attack came on while the patient was resting on vegetarian food and taking 10 grains of thyroid daily. Further, two periods of anuria, one after the attack and one after the labour, terminated after considerable quantities of thyroid substance had been ingested. It may be said that these were instances of *post hoc* not *propter hoc;* but it may equally reasonably be concluded that the administration of thyroid played a part in the favourable result secured. It may be that had I at first put the patient in bed on milk alone and given more thyroid than I did, she would have been spared the two convulsive attacks which occurred. The impression left upon my own mind takes the form of a determination to give thyroid substance an extended trial in cases of the auto-intoxication of pregnancy.

The case might also be cited as an illustration of the non-obstetric treatment of eclampsia. It has been the custom to regard the emptying

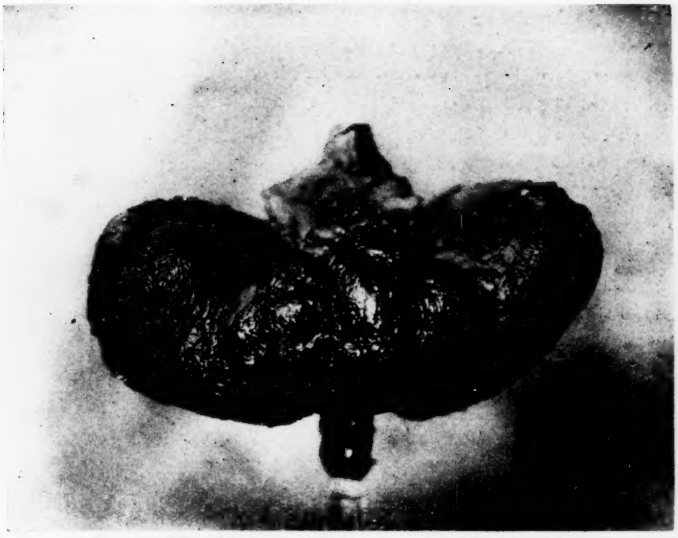

FIG. 1.—Thyroid gland with larynx and trachea from before.
Natural size.

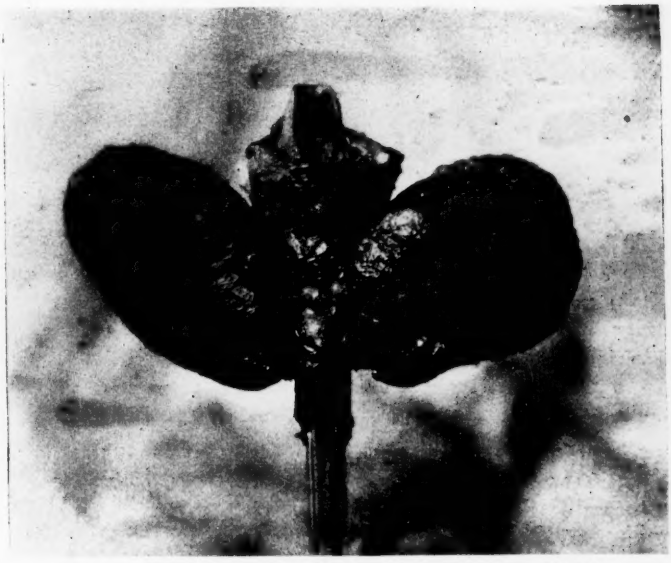

FIG. 2.—Thyroid gland with larynx and trachea from behind.
Natural size.

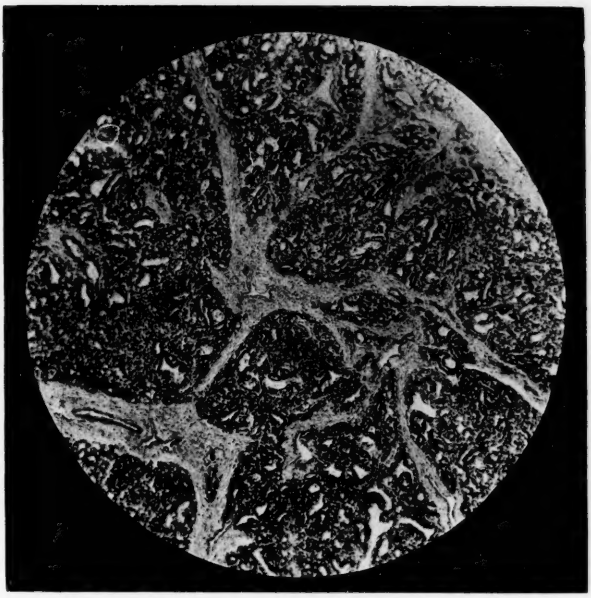

FIG. 3.—Micro-section of Thyroid gland. Low power.
(Photographed by Dr. Orr).

FIG. 4.—Micro-section of Thyroid gland. High power.
(Photographed by Dr. Orr).

of the uterus as an essential part of the treatment of grave cases of eclampsia. Most medical men have a natural and strong leaning towards active interference on the patient's behalf, and, in obstetric work, active treatment usually takes the form of emptying the uterus by one method or another. There is also the dread of allowing a woman to die undelivered. The customary accouchement forcé in eclampsia I believe to be explained by these considerations rather than by any proved advantage resulting from it. For example, a large number of observers are at present recording cases of eclampsia in which the patient has been delivered after the use of Bossi's dilator. Most of the patients recover, but there is nothing whatever to show that they would not have recovered had obstetric interference been omitted. It is indeed reasonable to suppose that certain patients who could have survived the eclamptic attack itself have died under the combined effects of eclampsia and accouchement forcé. While granting that the induction of labour is often desirable in order to prevent an eclamptic attack or its recurrence, I am inclined to believe that labour should not be artificially induced in the presence of convulsions or coma. If labour begins before or during the attack, it should be conducted with the care and patience which would be shown under more ordinary circumstances, but without unnecessary delay.

A review of the literature of "congenital gôitre" in Dr. Ballantyne's *Antenatal Pathology* indicates that most of the examples of this condition occur in "gôitre districts" and in gôitrous families. These "inherited" gôitres simply form a part of the subject of ordinary gôitre. But in two cases—those of Sir J. Y. Simpson and Prof. A. R. Simpson—enlargement of the fœtal thyroid followed the administration of potassium chlorate to the mother during pregnancy. This was the position when I showed my specimen at the Pathological Society of Manchester on March 11th, 1903. On the same evening, however, a fourth case was announced for demonstration by Dr. Angus Macdonald on the agenda paper of the Edinburgh Obstetrical Society, and on March 21st a fifth case was described in the *British Medical Journal* by Dr. Hewetson, of Birmingham. The occurrence of these five cases indicates that, quite apart from what we may call hereditary congenital gôitre, a form of enlargement of the fœtal thyroid may follow the administration of potassium chlorate to the mother under certain circumstances. At this point the question must pass, for research and elucidation, from the hands of the obstetrician into those of the pharmacologist. It is desirable, however, to sum up the present position. Three propositions may be made:—

1. Experience shows that in many cases of habitual abortion the continuous administration of small doses of potassium chlorate is frequently followed by the extension of pregnancy to its normal limits.

2. Careful microscopic examination of the abortive ova expelled by these patients shows that the death of the ovum is due, as a rule, to extensive thrombosis within the intervillous space.

3. Large doses of potassium chlorate are well known to produce certain destructive changes in the blood, the therapeutic use of the substance having occasionally caused death in this way, especially in children.

The third proposition affords a clue to the way in which the administration of potassium chlorate prevents abortion in certain patients in whom early death of the ovum has become habitual. For it is only necessary to suppose that potassium chlorate, given in doses too small to produce its toxic effects by destruction of the blood, still alters the state of the blood and renders it less coagulable, thus preventing clotting in the intervillous space and consequent death of the ovum from this cause.

It is not postulated that there must be any peculiarity in the blood of these patients who habitually abort from placental thrombosis, as passive pelvic congestion of mechanical origin is apparently the sole cause in some cases. At the same time, the occurrence of eclampsia and other manifestations of toxæmia in some of the cases in question suggests that early abortion from placental thrombosis may often be a result of, and a natural cure for, toxæmic states occurring in connection with pregnancy. Chlorate of potassium in small doses would thus appear either to reduce the coagulability of normal blood, or to neutralise the effects of some form of toxæmia which favours thrombosis.

As to the occurrence of hypertrophy of the fœtal thyroid in the five cases mentioned, it may be argued that a toxic state of the maternal blood was to blame for this, and also for previous abortions not prevented by the administration of potassium chlorate. It may also be argued that the hypertrophy of the thyroid was the direct result of the changes in the maternal blood caused by the potassium chlorate. So many healthy children have, however, been born after the prolonged administration of this substance to the mother that no definite conclusion appears permissible beyond the statement that under certain circumstances, at present not understood, the administration of potassium chlorate during pregnancy may be followed by hypertrophy of the thyroid gland of the fœtus. It is clear that

opportunities for observation on the points are rare, and that, in order to obtain further information, recourse must be had to experimental work. This has already been begun by a colleague, whose results I hope to bring before the notice of this Society at a later date.

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See Ballantyne, *Anatenatal Pathology*, for literature of congenital gôitre.

Case of Extra-Uterine Fœtation, Death from Septic-æmia; Remarks on the Significance of Adhesions of the Wall of the Gestation Sac to the Dead Fœtus.*

By John D. Malcolm, F.R.C.S. (Edin.), *Surgeon to the Samaritan Free Hospital.*

At the Obstetrical Society, on November 4th, Mr. Malcolm showed a specimen of an extra-uterine fœtation removed from a patient whose history was as follows:—Her age was 29, and she had one child, aged eight years. Fourteen months after the birth of this child the patient complained of severe pain in the pelvis, which continued about a fortnight, and gradually ceased under treatment by rest and vaginal douches. From that time onwards her health was good, the menstrual flow was never missed and never more than a week late until April 10th of this year, when the advent of the period was delayed for nine days, and it then came on with extreme bearing-down pain. Only a trace of blood was lost, and a fortnight later there was a slight red discharge for a few days. In May and June the periods were missed. At the end of June the patient was confined to bed with pains which were attributed to an impending miscarriage by the doctor in attendance. He also said there was much inflammation, and the parts in the pelvis were very tender. After five days of severe pain "something" came away from the vagina. It was not seen by a doctor, but it was declared to be a "miscarriage" by the woman who was acting as midwife. After this the health was better, but blood was lost from the vagina daily for nearly three months. The patient's abdomen enlarged so that her clothes had to be altered. In the middle of September "bits of flesh" escaped from the vagina for about a week, and then the abdomen gradually diminished until the waist assumed its usual size. At this time there was severe pain on the left side of the lower part of the abdomen, in the pelvis and down the left thigh.

The patient was admitted to the Samaritan Free Hospital early in October with a very painful rounded swelling behind and to the left of the uterus, rising above the brim of the pelvis, and being apparently about five inches in diameter. It was closely attached to the uterus which lay in front and to the right, and which, as

* Communicated to the Obstetrical Society of London, November 4th, 1903.

measured by the round, was 2½ inches long. The temperature varied between 101° and 99·5°F. daily. Pain and fever gradually diminished, and at the end of three weeks the parts were not very tender to touch. The abnormal mass in the pelvis was, or appeared to be, smaller, and its outline was irregular and nodular.

Mr. Malcolm diagnosed an extra-uterine fœtation, and opened the abdomen on October 27th. The abnormal parts were everywhere adherent in the pelvis, and were covered in by a loop of adherent bowel and epiploic appendages in front. The bowel was tightly stretched over the most prominent part of the swelling, and the latter could be seen above and below the coil, so that it was doubtful in which direction the mesentery was attached. After a little enucleation it was found that the bowel was the sigmoid flexure pushed forward by the swelling. Its mesentery was very thin. The anterior part of the loop was so firmly attached that it could not be safely separated, but the abnormal tissues were easily broken down, and part of their capsule was left on the bowel. Except for this the sac and its capsule seemed to be completely enucleated, there being very little hæmorrhage. A dead fœtus, four to five months old, was found in the deeper part of the pelvis, but its exact relations were obscure as the gestation sac was torn in the course of the enucleation. There was no liquor amnii and no collection of fluid of any kind was evacuated. The middle of the loop of intestine which was detached from the front of the sac was completely separated from its attachments for about an inch of its length, its mesentery and the capsule of the fœtal sac being so intimately united that it was impossible to separate them. No attempt was made to remove the adherent adventitious membrane from this loop of the bowel. The lumen of the gut was not opened, and its wall did not appear to be very thin. After complete enucleation of the abnormal tissues the broad ligament was tied and divided without difficulty. The sigmoid flexure when dropped into the pelvis lay naturally over the greater part of the raw surface that had been exposed. It showed no evidence of deficient blood supply. There was not much oozing, but there was a large surface from which the sac had been enucleated, and a drainage tube was therefore placed in Douglas's pouch, its upper end being fixed in the usual way between the lips of the lower part of the wound in the abdominal wall.

The operation was finished before eleven o'clock a.m., and the wound was dressed at 9·30 p.m., when 3½ ounces of thick red fluid had escaped from the tube with some organised clots. The discharge

was odourless and appeared healthy. The temperature was 100·2°F., the pulse was 112. At 4 a.m. next morning the temperature was 101·4°, and the pulse was 126. Three ounces of fluid had been collected from the tube and a considerable quantity had escaped along the side of the tube. This discharge was more serous and paler than that removed at the first dressing, and it had an odour distinctly suggestive of fæcal contamination. Notwithstanding this the fluid appeared to be quite healthy serum, and it contained clots which, as far as the eye could judge, were undergoing normal organisation. The kidneys were acting well, but flatus was not passing from the bowel. A small enema caused great pain and only led to the expulsion of a very little flatus. The temperature and pulse rose steadily. At 9-30 o'clock a.m. five ounces of thin serous fluid had been collected, and a great deal had escaped into the dressings. The odour of the discharge was more markedly suggestive of fæces than in the early morning, although, to the naked eye, it, and the clots found in it, appeared healthy. The patient died about twenty-six hours after the operation.

Permission to make a *post-mortem* examination was refused, so that it is not possible to make a statement of the conditions existing, but there seemed to be no doubt that death was due to septicæmia, and that this was caused by the escape of infective matter from the bowel. The separation of the gut from part of its mesentery may have aided the escape of morbid products by reducing its vitality. It might have been better to have made a large opening into the vagina for drainage purposes in this case, but the parts at the time seemed so dry that there was some doubt as to the necessity for drainage of any kind. The question of resecting the damaged bowel also presented itself after the patient was dead, but it did not seem at the time of the operation that the circumstances warranted such a procedure. The possibility of its being required did not occur to the operator.

It seemed fairly certain that the child in this case was conceived early in April, that at the end of June a deciduous membrane was thrown off and that the illness in the middle of September was associated with the death of the fœtus. At that time it would appear that a second deciduous membrane was expelled. This was the first occasion on which the speaker had observed a redevelopment of the decidua in a case of extra-uterine fœtation, but Sir Halliday Croom (*Practitioner*, November, 1903) had noted that a second membrane is sometimes thrown off by the uterus.

Mr. Malcolm thought that this case supported his contention,

advanced at the last meeting of this Society, that every case of extra-uterine fœtation should be operated on as soon as it was diagnosed if the fœtus was believed to be alive. The chances were very great that after the first few months of gestation if the fœtus died it would find its way by a suppurative process through some mucous membrane and would cause a more or less serious septic illness which in many cases nothing would cure. It seemed right therefore to anticipate this condition by immediate operation. Mr. Malcolm had been lucky hitherto in not meeting with such cases, and he had only had one fatality from an operation for extra-uterine fœtation before the one now recorded; but he had seen several septic cases operated on, some of them absolutely hopeless, and the risks of hæmorrhage seemed to him less than those of sepsis. Moreover, in many recorded cases the placenta had been found quite easy to deal with. Doubtless occasionally an operation would be safer when the child was dead or even when suppuration had taken place, but in the great majority of cases the patient gained nothing by waiting; on the contrary, she had the opportunity of developing conditions more serious than those already existing. Hence, unless there were very definite reasons in a particular case for postponing an operation, Mr. Malcolm urged that surgical treatment without avoidable delay should be recommended whenever an extra-uterine fœtation was diagnosed in an advanced stage or in an early stage if the fœtus was thought to be alive.

If the case under discussion had been operated on at the third month or even before the febrile attack in September the chances of success would, in his opinion, have been infinitely greater.

Description of the Specimen and Remarks.

The specimen consisted of a sac which had been torn during the operation. It was formed of the left Fallopian tube, the left ovary and adventitious membranes. The tube was ruptured at its outer end, and the placenta, measuring about two inches across, was attached to the ruptured part. Close to the placenta and partially underlying it there was a solid rounded mass, measuring nearly three inches in diameter, which appeared to be old blood-clot. It lay behind the broad ligament and was probably effused into the space between the chorion and the amnion. The ovary was below the adventitious sac, its position proving that the gestation was not in the broad ligament. The fœtus, which measured a little over five inches in length, was attached to the placenta by a long cord. The point of interest which led to the exhibition of the specimen was the

fact that the abdomen of the fœtus and parts of the right forearm were intimately attached to the adventitious tissue forming the gestation sac.

A similar condition was described by Dr. Cullingworth in the 30th volume of the Obstetrical Society's *Transactions*, p. 483. In his case the fœtus had died at the eighth month of gestation, and was successfully removed eight months later. It was free from odour, there was no liquor amnii, and the fœtal skin "had become intimately adherent to the cyst wall wherever it was in direct contact with it." Another case was published by the late Mr. Lawson Tait in the 34th volume of the Obstetrical Society's *Transactions*, p. 192. In that case a fully developed child was successfully removed five months after term. There was no liquor amnii and there was no evidence of decomposition. All the upper surface of the child "had become adherent to the omentum and to the anterior parietal peritoneum," the adhesions being "really very dense."

Commenting on this, Mr. Tait wrote that "a very singular cause of speculation arises from the creation of dense adhesions between the living tissues of the parietal peritoneum and what we must regard as the practically dead tissues of the fœtus. It is difficult to imagine that such an essentially vital process could occur between living tissues and tissues absolutely dead. Something like an illustration of this occurs in Hamilton's sponge grafting experiments, but there it becomes perfectly certain that it is not a real adhesion, but simply a bracing together of the really living and the really dead tissues by the penetration of the sponge cavities by long fingers of living cell tissue, so that the sponge becomes a sort of trellis work. There is not any real union, but in this case the union must have been absolutely continuous and cellular. This intra-peritoneal child was, of course, dead as an individual, and dead so far as its physical functions were concerned, although it could not be regarded as absolutely dead tissue. Some kind of low form of vital action must have been going on in it—a conclusion which I think is established by the fact of its resisting decomposition, and the formation of the adhesions." It was well known, however, that granulating tissue may become very intimately adherent with dead tissue as in the case of a piece of cloth in a wound or a stone fixed by granulations in a kidney, or a piece of aseptic dead tissue placed in the peritoneal cavity.

It seemed to Mr. Malcolm that in the two cases he cited and in the case from which the specimen shown was taken, the fœtuses were

absolutely dead in every sense, and that Mr. Tait's suggestion with regard to sponge grafting involved the correct explanation of the condition observed, although he brought it forward only to set it aside. The healthy chorion appeared to be capable of living in, and absorbing nourishment from, the connective tissue wherever it might be placed, and the amnion was united to the chorion by connective tissue. So long as the amnion was living it absorbed nourishment from any connective tissue with which it was in contact and formed a secreting surface which protected the fœtus from the tissues. But when the amnion was dead the surface to which it was attached was left, so to speak, bare, and, as in the case of a surgical wound, it was necessary that it should either unite itself with and absorb dead structures with which it was in contact, if their absorption was possible, or it must form an excreting surface. If it excreted, an abscess or a collection of serum would develop. The latter condition, the speaker thought, had not been described so that if an abscess did not form the alternative seemed to be that the surface outside the amnion must gradually absorb that membrane after its death. When the amnion was gone the tissues would seize upon and absorb the fœtus just as a piece of aseptic silk was absorbed or a piece of aseptic sponge became covered in by granulation. In course of time the living tissues would figuratively eat up the dead, or as much of them as was capable of absorption, unless some condition intervened to arrest the process. Thus the condition shown in this specimen seemed to explain the mode of absorption of an extra-uterine fœtation.

In a few rare cases the form of the soft parts of a full time fœtus was preserved intact. The speaker did not venture to explain this, but he suggested that as both skin and amnion were excreting surfaces, if the greater part of the latter preserved some of its vitality for a time, the subjacent parts might be prevented from coming in contact with the fœtus until its tissues had undergone sufficient modification to make their absorption impossible. There seemed to be no doubt that such changes did occasionally occur.

A Case of Puerperal Eclampsia Treated by Large Doses of Thyroid Extract.

By H. Oliphant Nicholson, M.D., M.R.C.P. (Edin.),
Obstetric Physician to the New Town Dispensary, Edinburgh.

In several recent papers dealing with the subject of puerperal eclampsia I suggested the administration of some preparation of the thyroid gland, both as a prophylactic and also after the onset of actual convulsions. Firstly, as a prophylactic remedy, which may be used in the condition of toxæmia commonly known as the pre-eclamptic state, I recommend that thyroid extract should be given in relatively small doses of five to twenty grains in the twenty-four hours. I think the main object of thyroid treatment at this stage is to readjust the processes of nutrition in such a manner as to complete more fully the metabolism of nitrogenous substances. I have now frequently used thyroid extract in this way, and have no doubt whatever that, in many cases at least, it exerts a very favourable influence on pre-eclamptic symptoms, and that it really does modify or readjust the metabolic processes of the body so as to admit of the termination of pregnancy at term, and without the occurrence of convulsions. Secondly, in the presence of actual convulsions also, thyroid extract is a valuable remedy. But at this stage of the toxæmia it is generally quite useless to give the small doses above mentioned. Very large doses may have to be used before any good effects are apparent, for the rationale for its use is then entirely different. The urine is greatly diminished in quantity, or may be completely suppressed, and the really essential aim of any method of treatment is to get the kidneys to secrete again.

In previous communications I have laid great emphasis on the condition of the circulation, which, I think, is invariably present in the eclamptic state. The condition of the arteries and arterioles is one of profound constriction, with resulting rise in the blood pressure. I am of opinion that these circulatory features which develop in eclampsia, unimportant as they may appear, give the clue to the only rational method of medical treatment. *Vaso-dilatation* is the principle of treatment indicated. This principle is involved in every successful therapeutic method of treating eclampsia, and it is the complete alteration produced in the condition of the circulation which makes it possible for the kidneys to resume their functions. Therefore I believe that in the absence of an accepted theory of the

causation of eclampsia it is well to lay stress upon this abnormal state of the circulation at the end of pregnancy, more especially when, as is usually the case, it is accompanied by a diminution in the quantity of urine passed, together with a fall in the percentage of urea.

For various reasons which I have previously discussed, thyroid extract appears to be an ideal vaso-dilator in cases of actual eclampsia, but it is then, as a rule, absolutely necessary to use very large doses. Thirty or forty grains may be given at first, and a second dose of twenty or thirty grains may be required in six or eight hours if there are no evidences of improvement. These doses may appear to be somewhat heroic, but personally I would not hesitate to give much larger quantities to a patient suffering from severe eclampsia. One wishes to produce symptoms of thyroid intoxication as rapidly as possible, and, so far as I have observed, less danger is incurred from giving a few large doses than from the continuous administration of much smaller quantities.

I have elsewhere referred to the value of large doses of morphine hypodermically for the immediate treatment of eclamptic convulsions. I stated that a sufficiently large dose was the most prompt and powerful vaso-dilator one could employ. I also indicated that the simultaneous or subsequent use of thyroid extract seemed to provide a most successful combination of remedies for the purpose of rapidly re-establishing the secretion of urine. I wish to record the following case of eclampsia, as it affords a good illustration of the beneficial effects of this method of treatment:—

Mrs. A., 21 years of age, a primipara, came to the Midwifery Department of the New Town Dispensary, Edinburgh, on the 26th of June last. She was then in the eighth month of pregnancy, and presented no specially abnormal symptoms, although her pulse struck me as being somewhat slower and of higher pressure than usual. She had had no "morning sickness" in the early months of her pregnancy, but had been troubled a good deal with heartburn.

It is my custom in all primiparous cases, during the last few weeks of pregnancy, to practice abdominal palpation in order to locate the position of the fœtus, and on July 20th I visited Mrs. A. for this purpose. The presentation was a normal one, but during my examination I found that there was a marked degree of œdema of the abdominal walls and of the body generally. Mrs. A. did not feel ill; she had no headache or vomiting, and the secretion of urine was only slightly less than normal. A specimen was examined, and although the specific gravity was only 1015, suggesting a diminished urea excretion, still there was no trace whatever of albumen. The only thing that impressed me at this visit was the condition of the circulation, and I did not then fully realise, as I do now, how much

significance to attach to the indications afforded from its study. The pulse was both abnormally slow and of unusually high pressure, and the type of sphygmogram obtained was that which I have found to be invariably associated with a greatly increased peripheral resistance. I append a pulse-tracing (Fig. 1), and may at the same time state that on the only other occasions—three in number—in which I obtained almost identical tracings from women towards the end of pregnancy, and before the commencement of labour, all the patients were obviously in the pre-eclamptic state. I only wish at present to draw attention to the exaggerated size and the unduly sustained character of the second summit of the systolic wave, and also to another feature, namely, the variable duration of the diastolic phases of the pulse curves. From an examination of a very large number of pulses in pregnant women nearing the end of gestation I am able to assert that the development to such a marked degree of these characters strongly suggests impending danger in the way of eclampsia. In the case of Mrs. A. there was undoubted hypertrophy of the left ventricle, and there were none of the evidences, which one commonly finds during pregnancy, of dilatation of the right heart. There was no pulsation in the jugular veins. In spite of the points I have detailed I did not adopt any special treatment beyond prescribing some blue and rhubarb pills, and ordering milk diet.

FIG. 1.—Sphygmogram from a young primipara with pre-eclamptic symptoms. Illustrates the type of tracing obtained at the end of pregnancy when eclampsia is impending.

I saw the patient again on July 27th, and she appeared to be going on satisfactorily. After this visit I was out of town for a week, and on the evening of August 5th a message reached me from one of the Dispensary pupils asking me to come immediately to see Mrs. A., whom he was attending. The history I obtained was as follows:—On the evening of August 4th Mrs. A., whose pregnancy had advanced to full time, did not feel so well as usual. She was drowsy, complained of severe headache, dimness of vision, and had several attacks of vomiting. During the night slight labour pains commenced, and the membranes ruptured early. On the following day (August 5th), about 11 a.m., the pains became more severe, vomiting continued, and from this time onwards the secretion of urine apparently ceased. The student in charge of the case was called in the same evening, about 6-30 p.m., and found the patient in a semi-comatose condition, and unable to give any account of how she felt. The pains were strong, and the os was fully dilated. He was much alarmed at her condition, and more particularly as shortly after I had been summoned a very severe eclamptic fit occurred which lasted about two

minutes. This seizure was followed by complete coma, and the respiration became stertorous in character. I arrived at the house a quarter of an hour later, just as the natural powers had completed the delivery of a living child. The patient was still unconscious, and so far nothing had been done to control the eclamptic state. The placenta was expelled in about twenty minutes, and, as is usual in such cases, was followed by very little hæmorrhage. Immediately afterwards a typical eclamptic seizure occurred which lasted two minutes and left the patient in a more deeply comatose state. Half a grain of morphine was now injected hypodermically, and about half an hour later the skin for the first time showed indications of commencing perspiration. An hour later the third fit occurred. It was less severe in character, but lasted about a minute and a half. At 9-30 p.m. I left the house in order to obtain some thyroid extract, and I returned at 11 p.m. No more fits had occurred. The patient, though still semi-conscious, was able with difficulty to swallow eight 5-grain tabloids of thyroid extract (40 grains). I had intended to give this dose in solution per rectum if the patient had been unable to swallow. No urine had been passed since the early morning, and by means of a catheter it was found that the bladder contained only about three drachms. This urine became solid on boiling. A Jubilee nurse very kindly remained with the patient during the night.

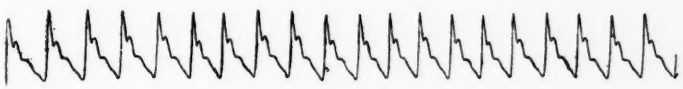

FIG. 2.—Shows the alteration in the character of the pulse after "thyroidism" is produced.

On August 6th, at 10 a.m., I saw the patient again. She had slept fairly well during the night, but had vomited several times. She had perspired profusely. The temperature was normal, and the pulse was 92 per minute. She was now fairly conscious, and complained of much pain in her abdomen. On examination the bladder was found to be greatly distended, and by catheter 40 ounces of urine were drawn off. At 10-30 a.m. 30 grains of thyroid extract were given. The patient was still drowsy, but gradually became less so, and at 3 p.m. she passed 35 ounces of urine. At 8-30 p.m. I found that the temperature had risen to 101°, and the pulse-rate was 115 per minute. She was now quite conscious, and was perspiring very profusely. She looked flushed and complained of headache. Evidently "thyroidism" had been caused by 70 grains of thyroid extract given during a period of twenty hours. The tracing (Fig. 2) shows the marked alteration produced in the character of the pulse. At 9-30 p.m. 30 ounces of urine were passed, and at 10 p.m. a third dose of thyroid extract—15 grains—was administered. Eighty-five grains had been given in 23 hours.

On August 7th, at 10 a.m., I found the patient in practically her normal condition again. The nurse had given an enema, which had acted well, and urine was still being secreted copiously. Ten grains of thyroid extract were given, and the same dose was repeated at night. No more fits had occurred. After this date the patient progressed uninterruptedly, and the œdema disappeared very rapidly. A small amount of albumen was still present in the urine. The thyroid extract was continued in 10 grain doses twice daily till August 9th; then each dose was reduced to 5 grains. After ten days it was stopped altogether.

The case I have detailed illustrates a well-known type of eclampsia in which, I think, the most striking features are the sudden and almost complete arrest of the secretion of urine, with the presence temporarily of a large amount of albumen. The noteworthy points in relation to the treatment adopted are the unusually early re-establishment of the renal functions and the rapid and complete disappearance of all the symptoms. In less than twelve hours 40 ounces of urine were secreted, and the action of the kidneys was afterwards fully maintained. In such cases I believe the condition of anuria is a functional one; the kidneys, in favourable cases, suffer no serious or permanent damage. As the mechanism of the arrest of the secretion of urine is so important perhaps I may be allowed to refer briefly to some physiological points in connection with the matter.

There is a definite relationship between the general blood pressure and the secretion of urine; but it must be remembered that it is the pressure of blood in the glomeruli of the kidney that determines the amount of the secretion. Anything which causes a contraction of the arterioles of the body generally will raise the pressure in the arteries, and will at first raise the pressure in the glomeruli also, thus leading to an increased secretion of urine. But under various circumstances this contraction of the arterioles may become so pronounced that the branches of the renal artery are likewise constricted. Then, although the general blood pressure is exceedingly high, the pressure in the glomeruli may become so greatly reduced that the secretion of urine ceases entirely. Such a state of suppression of urine can be produced experimentally in dogs by putting clamps on the renal arteries, and Overbach has shown that albuminuria is thereby produced. The only way in which it is possible to re-establish the secreting function of the kidneys under such conditions is *to dilate the renal arteries*, and then, with the pressure in the systemic arteries unchanged, the glomeruli will soon become filled with blood, and diuresis will commence.

In eclampsia these circulatory phenomena, resulting in the

arrest of the renal section, undoubtedly occur, but we do not know whether they are brought about by toxic or other influences. So far as I am aware we know of no toxin which can at all compare with the internal secretion of the supra-renal glands as a constrictor of the arteriorles and capillaries. One can well imagine that the circulation of blood through the kidney—an organ so abundantly supplied with vaso-motor nerves—could be stopped altogether if a very slight excess of supra-renal secretion happened to reach it. I believe that normally the thyroid secretion is the opposing influence which safeguards the renal circulation from a dangerous over-action of the supra-renals; but in some cases of eclampsia of the type I have described it seems quite possible that such an over-action does occur, and in this way the production of such symptoms would be adequately accounted for. Hence perhaps the necessity of using the very large doses of thyroid extract which I have recommended in order to counteract the constriction of the renal arterioles.

Metrorrhagia in a Girl Aged Fourteen Years.

By W. K. Walls, M.B. (Lond.),
Obstetric Assistant Surgeon, St. Mary's Hospital, Manchester.

Instances of severe metrorrhagia in adolescents, at or about the commencement of menstruation, are sufficiently rare, and sometimes of such grave importance that the following brief notes of a case may be of interest:—

Hilda P. began to menstruate in August, 1902, at the age of thirteen years and four months. She had two ordinary periods, with a normal amount of discharge, and then a third period with rather scanty loss. The fourth period began in December, 1902, and continued till the beginning of April, 1903, when the patient came under the care of Dr. Normington, of Nelson. The discharge was copious, most heavy at night or in the early morning, and frequently contained small dark clots. During the three to four months which had elapsed since the commencement of this "period" the discharge had been continuous except for a very occasional interruption of a day or a night. The general treatment had consisted of rest in bed with cold diet. Various medicines had been given, mostly of little avail; the most satisfactory was mist. ferri sulph. *c* magnes. sulph., whilst ergot seemed to lead to an increase in the amount of discharge. The hot douche had been tried without benefit, but no local applications of turpentine or iodine had been made.

On April 9th, 1903, in consultation with Dr. Normington, I found the patient a well-built girl, but in an extremely anæmic condition. Her relatives stated that she had frequently fainted when her head was raised from the pillow, and her facial appearance fully agreed with this history. On examination *per vaginam* considerable discharge was seen, the cervix uteri was found to be rather large, and of flabby consistence, the external os uteri was wide, the cervical lips being thin at the edge, and the uterus was anteflexed. Curetting was performed at once. The uterus was about three inches and a quarter long; its canal was very easily dilatable, and many smooth strips of thick pale endometrium were removed by means of the flushing curette. Apart from these particulars there appeared nothing wrong with the uterus; examined bimanually with a large dilator in its cavity there was no irregularity of shape, for instance,

* Communicated to the North of England Obstetrical Society, December, 1903.

such as might have indicated some local new formation, and no abnormality of the appendages was detected. The curetting was followed by gauze plugging.

This gauze was removed next day, and I am informed that the discharge continued for a fortnight, but in much milder form, and improved in character. It then ceased, and the patient began to gain strength. At the present time, eight months after the operation, Dr. Normington reports that the periods have been normal.

I have been unable to satisfy myself as to the etiology of the condition in the patient under mention. Hæmophilia is generally at the root of such cases, and Dr. Donald* has recorded one of a "bleeder," where curetting was followed by a fatal issue. In the present instance, though the parents were weakly looking, there was no history of hæmophilia in the family, nor had the patient herself suffered unduly from epistaxis or other like symptoms. At the operation the hæmorrhage was fairly free, but in no way alarming.

There was no history to suggest the likelihood of any retained products of conception, and this possibility was entirely negatived by the conditions observed at the curetting. There was also no history of any infection, but no specific enquiry was made in regard to infantile vulvitis, or vaginitis.

Microscopic examination of the tissue removed by the curette shows the endometrium characterised by a great amount of interglandular small-celled infiltration; the glands themselves are for the most part rather small, but here and there one or two of unusually large lumen; there is no great increase of the vessels. These conditions point to some amount of agreement with those found by Dr. Donald† in a case of persistent menorrhagia in an adult, and which he was inclined to regard as one of "idiopathic endometritis."

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CRITICAL REVIEW.

The Causation of Eclampsia.

By Comyns Berkeley, B.A., M.B., B.C. (Cantab.), M.R.C.P. (Lond.), M.R.C.S., *Assistant Obstetric Physician to, and Lecturer on Midwifery at, the Middlesex Hospital; Senior Physician to Out-patients at the Chelsea Hospital for Women.*

Although I do not propose, neither am I able to suggest, any new theories concerning this disease, yet since "the great art in life is to discover any profitable elements there may be in disadvantageous circumstances" (Chincolle), perhaps a review of the work that has been done on Eclampsia will not be an unprofitable task.

First, then, as to the cause of eclampsia. The theories with regard to this may be divided into two main classes:—

1. The Ancient Theories: Mechanical.
2. The Modern Theories: Toxæmic.

It is, however, true that some *modern* authorities may still be found upholding the *mechanical* theory, and some *ancient* authorities have, without being cognisant of the importance of their observations, suggested the *toxæmic* theory unwittingly.

The Mechanical Theory.

From early in the last century, when Rayer and Lever drew attention to the frequency of albuminuria in eclampsia, till recent times the kidney has been looked upon as *the* primary cause of the disease. It was so easy to explain. The kidney is passing albumen, therefore the kidney is diseased. The kidney is diseased, therefore it is not doing its work properly, consequently those normal waste products of the body which should be eliminated by the urine are not. These waste products cause the fits.

The next question which arose was, *what damages the kidney?* and was there not an answer ready to hand, the increased intra-abdominal pressure and the pressure of the growing uterus. This theory was, therefore, called the *mechanical* theory and there were many factors that seemed to point with no uncertainty to its accuracy. Was it not true that eclampsia nearly always occurred under conditions which caused the pressure to be greatest? A large majority of the patients were primaparæ, women whose abdominal

walls had never been stretched. The largest percentage of cases complicated labour, when the pressure from the uterus both on account of its size and the strength of its contractions would be greatest. The frequency of twins in eclampsia was greater than in normal labour, many cases were associated with hydramnios, and, lastly, on birth of the child, that is on a great reduction of the intra-abdominal pressure taking place, the fits stopped.

In course of time three theories were evolved to account for this damage to the kidney.

1. That it was caused by pressure on the renal veins.
2. That it was due to increased arterial tension.
3. That it resulted from pressure on the ureters.

Pressure on the Renal Veins. In some cases of ovarian tumour pressure on the renal vein causes congestion with a resulting albuminuria. Remove the tumour and the albumen disappears. In a similar way, it was asserted, pressure of an enlarged uterus together with increased intra-abdominal pressure can cause albuminuria and eclampsia. On the birth of the child the albumen quickly vanishes and the eclampsia stops. This theory would not, however, account for eclampsia in the earlier months since an ovarian tumour does not cause albuminuria till it is as large, if not larger, than a full term pregnancy, whilst in heart disease or complete thrombosis of the renal veins, conditions which cause intense venous congestion, no fits occur. Again the kidneys from an eclamptic patient will in most cases on examination be found undergoing some acute degeneration and are not at all hyperæmic and cyanotic as they are in cases of venous congestion. A further argument against this theory is that in pregnancy complicated with tumours, where the pressure may be far greater than that of twins, the relative frequency of eclampsia which was noted in twins is absent.

Increased Arterial Tension. During pregnancy the arterial pressure is raised. During the intermittent contractions of the uterus the blood is prevented to a great extent from flowing into the uterus, and as some of the arteries supplying the uterus arise from the aorta near the renal artery it is supposed that the pressure on the renal arteries will be raise sufficiently to cause an exudation of leucocytes and interference with its circulation. The stronger the contractions the greater will be the tension. Eclampsia before the fourth month, that is, before the appearance of intermittent uterine contractions, is very rare. The more pregnancy advances the stronger are the intermittent contractions and the commoner becomes eclampsia, till

at last, when eclampsia is commonest, the pains are strongest and the tension is greatest, that is, labour is in progress. Against this theory, however, is the fact that when the renal and splanchnic nerves are divided, so that the blood pressure in the kidney is enormously increased, no albuminuria is found, whilst the amount of albumen, which in eclampsia is very great, in the high tension of chronic Bright's disease with arterio-capillary fibrosis is small (Dakin). It has also been demonstrated by Runeberg that increase of filtration pressure diminishes the permeability of a membrane to albumen.

Pressure on the Ureters. Halbertsma first enunciated the theory that pressure on the ureters interfered with their circulation, prevented the elimination of waste products, damaged the kidney and so caused eclampsia. In support of his views he was able to prove by *post-mortem* examination that in some cases the ureters were dilated. Since then dilatation of the ureters has been noted, among others, by Prutz, Olshausen, Hubert, and especially by Herzfeld. Clarence Webster draws attention to the fact that his frozen sections prove that the pregnant uterus moulds itself accurately along each side of the spine, more particularly at the brim, and even if this did not cause a local interference there still might be a dangerous pressure resulting in a paresis. Frozen sections after birth of the child also show that the post-partum uterus in its contracted and retracted state fills the greater part of the normal pelvic cavity so firmly as to form a ball-plug, compressing all the extra-uterine tissues against the pelvic wall, and this more especially for the first two or three days of the puerperium, after which eclampsia is very rare. As a rule the ureter is protected from pressure by the different structures in its neighbourhood, and more especially by the bifurcation of the aorta into the common iliacs. Kundrat has pointed out that a higher or lower bifurcation of the aorta than normal would displace the ureters and so render them liable to pressure by the fœtal head as they cross the brim of the pelvis. In connection with this theory it is worthy of note that the ureters are only dilated as far as the common iliacs, and in primiparæ the fœtal head has sunk into the pelvis some time before term.

Strassmann has gone very carefully into this matter of the level of the bifurcation of the aorta, but his results do not agree with Kundrat's with regard to the special liability of an abnormal bifurcation favouring eclampsia.

Herzfeld, with Kundrat, is very strongly of the opinion that pressure on the ureters is one of the causes of eclampsia. Gessner thinks that eclampsia may be due to traction on the ureters by the

altered position of the bladder due to the growing uterus. Lastly, Aufrecht has ligatured the ureter in a dog. Three days later he killed it. *Post-mortem* the kidney was found much swollen, the pelvis and upper part of the ureter much distended, the cortical tubules damaged, dilated and containing abundant hyaline and fibrinous casts, and the epithelium showed granular and fatty changes. These views, however, are not accepted by most people. That dilatation is absent in the majority of cases, that the ureters are sometimes found dilated, as shown by Olshausen and Stadtfield, in non-eclamptic puerperal women, that patients improve on death of the fœtus, though the pressure is the same, that eclampsia occurs in multiparæ and breech presentation, that in those cases where obstruction of the ureters is most marked—cancer of the uterus—fits are very rare, all suggest that if pressure on the ureters has any relation at all to eclampsia it can only be a casual one.

Before proceeding to the discussion of the *modern theories* as a cause, it will be better to briefly note what post-mortem changes have been found in women dead of eclampsia since they have a very important bearing on the subject.

The Woman: Kidney, *Naked Eye Appearances.* If there is disease of old standing the signs will be those of chronic interstitial nephritis. If recent, then it is enlarged, congested and has the appearance of a parenchymatous nephritis. *Microscopical Appearances.* In the majority of cases "the characters closely approach the different coagulative necroses found in infectious diseases. The lesions fall principally on the epithelial cells and vessels in contact with them." (Bouffe de St. Blaise.)

Liver: *Naked Eye Appearances.* The liver may be found studded with numerous minute hæmorrhages with an occasional larger hæmorrhage under the capsule. These hæmorrhages are really minute infarctions due to thrombosis of the small branches of the portal vein. *Microscopical Appearances.* The outline of the liver cells is obscured and they are undergoing fatty degeneration or necrosis. The infarctions and necroses coalesce to form large sequestra which extend and kill the liver substance, and liver emboli are found in other organs. The liver changes are, in fact, remarkably similar to those found in acute yellow atrophy, phosphorus poisoning and yellow fever being the lesions found in the liver of an acute toxæmia.

Brain: *Naked Eye Appearances.* The most common condition noted has been one of œdema with flattening of the convolutions. At times there are punctiform hæmorrhages into the cortex and basal

ganglia with an occasional large hæmorrhage and there are multiple areas of softening.

Spleen. Similar changes have been noted to those in the liver, the organ being enlarged, with numerous hæmorrhages, into the substance and under the capsule.

Alimentary Canal, Lungs and Heart. Nothing definite; occasionally small hæmorrhages.

Ureter. In a certain percentage of cases (Herzfeld 22 per cent., Löklein 25 per cent.) these are found dilated, at times as large as a man's thumb.

Thrombi. Schmorl and Winkler report metastatic thrombi of liver and placental cells, whilst Virchow and Winkler have reported cases where fat emboli were found in the lungs and glomeruli.

The Fœtus. In a large number of cases minute hæmorrhages have been found in the kidneys, liver and lungs with fatty degeneration or necrosis, more especially in the liver and kidneys.

So much for the *post-mortem* changes. And now to consider the *modern theories* of eclampsia.

The Toxæmic Theory.

During the last few years the results of experimental work and the more careful pathological investigations of the organs of women dead of eclampsia have been such as to cause most authorities to abandon the idea of the kidney being the organ primarily at fault in eclampsia and to search for some other theory which would better fit in with the ascertained facts. In health the waste products of the body are either converted into innocuous bodies by such organs as the liver, thyroids, para-thyroids, supra-renals, etc., or eliminated by the kidneys, intestine and skin, and these organs are known as the "*organs of defence.*" During pregnancy there is a marked increase in the amount of waste products, and perhaps the pregnancy itself may give rise to new poisons. In most women the "*organs of defence*" perform their functions sufficiently well to carry their owners safely through pregnancy. If, then, it be granted that in some women these "*organs of defence*" are so affected by the increased work they have to do or by the peculiarity of some of the poisons that they fail, then there are at once all the elements for an auto-intoxication present. Suppose the liver or thyroids, for instance, are unable to convert these poisons into innocuous substances, then the kidneys have to eliminate them, and after a while the kidneys also are affected by the poison, and the poison is consequently not eliminated but remains behind circulating in the blood and causing

eclampsia. The kidneys are as a rule, temporarily at any rate, injured, as is shown by the passage of albumen, but it is even possible for perfectly sound kidneys to fail in their functions for a short while should the blood supply be diminished, and it has been shown that one effect of these poisons is to cause constriction of the renal arteries and anuria which would account for those cases where no renal change is found *post-mortem* and no albumen is found in the urine. On reference to the *post-mortem* appearances of the various organs it will be seen that they are all indicative of some general poison, some toxæmia, and it is only by some such theory that the clinical and pathological changes can be correlated.

This theory of the *toxæmia of pregnancy* first attracted notice after the statement by Bouchard that "health depends on a proper adjustment between the production and excretion of toxic substances, an increase of the former or diminution of the latter leading to toxæmia," and he considered that the secretions of the body, more particularly of the urine, would serve as an index of this toxicity. Thus in health the toxin of the urine would be greater and that of the blood less than in disease. Following these lines a large amount of experimental work has been done on the urine and blood, with the following results:—

URINE: *In the Non-Pregnant.* Bouchard's normal urotoxic dose was 45cc. per kilo of animal's weight. Tarnier, Goria, Labadie-Lagrave, and Ludwig and Savor accepted this as correct. Blanc found it varied from 38cc. to 65cc. Volhard that it was much greater, 87·5. Schumacher that it depended on the density of the urine, being much greater with highly concentrated urine. Stewart, in his first experiment, that it was great; in his second experiment, that it was less than his first experiment; in his third experiment, that the urine was innocuous.

In the Pregnant (but healthy). Tarnier, Chambrelent and Demon, Blanc, Labadie-Lagrave, Ludwig and Savor, Volhard and Stewart in his first and second experiments, found the urotoxic dose greater, that is, the urine less toxic than normal. Schumacher noted that the difference was simply due to the amount of concentration.

In Labour. Goria found the urotoxic dose to be much greater than normal, 107cc., that is, the urine was very much less toxic.

In the Puerperium. Goria, Blanc, Labadie-Lagrave found the urotoxic dose greater; Stewart, in his third experiment, found the urine to be innocuous.

In Eclampsia with Convulsions. Ludwig and Savor found the urotoxic dose less; Tarnier and Chambrelent much greater; Volhard's

results were very contradictory; Schumacher that the difference was simply due to concentration.

The cause of these divergencies of opinion. On reference to the papers of these various workers it will be found that the method of collecting the urine, the length of time it was kept before being injected into the animal, the temperature of injection, the rate of injection, its preparation beforehand, whether it had been boiled or not, mixed with antiseptic or not, differed in all of them, and that the more precautions they took the less toxic did the urine become, till in Stewart's third series of experiments (he was dissatisfied with the precautions taken in the first two) where every precaution was taken to inject absolutely pure urine by only using that which was free of all bacteria, he found that urine is under these conditions quite innocuous.

The Blood Serum: *In the Non-pregnant.* Rummo found the toxic dose to be 10cc., Leclainché Rémond 27cc., Masset and Bosc 12·5 to 18·5cc.

In the Pregnant. Ludwig and Savor, and Volhard found the toxic dose less, that is, that the serum was more toxic.

In Eclampsia. Volhard 5·25cc., Tarnier and Chambrelent 3·4cc., Seligman 2·5cc.; all found the toxic dose less than ever.

Schumacher, however, found that in all cases the toxicity of the serum was equal, and, contrary to Tarnier's results, the serum of the fœtus in eclamptic cases is not more toxic than that of the mother.

Masset and Bosc, when trying to estimate the standard toxicity of the normal serum, regarded asphyxia as one of the chief causes of death on account of the large amount of coagulation they got, so they came to the conclusion that intra-venous injection was an unsuitable method. By removing the coagulable ferments they found the toxicity was reduced, and in a third series of experiments by a special process they separated from dogs' blood an albumenoid body which when injected into the circulation of rabbits caused death without coagulation.

Doléris and Butte showed that in eclampsia a crystalline inorganic body could be separated from the blood which when injected subcutaneously caused death with convulsions in various animals.

These two methods of testing the toxic doses (that is, the number of cc. per kilo. of the animal's weight it takes to kill it) of urine and blood serum may be taken as a *direct* method of proving whether eclampsia is due to a toxæmia.

As far as the experiments with the urine lead us it is evident that one must confess there is no proof. With the serum, however,

it is different; there seems to be a probability of proof, and it is especially interesting to note that two substances have been extracted from the blood which are highly toxic, and it is probably more in connection with this testing of the serum, especially in the pre-eclamptic stages, that the true causes will eventually be discovered. For a very good critical review on this subject the reader is referred to Eden's paper. There is still a third method of endeavouring to prove the toxæmia of pregnancy.

The Indirect Proof. If it can be established that elimination by the kidneys is diminished during pregnancy, and especially in albuminuria and eclampsia, it will be evident that an impure or toxæmic condition of the blood must result.

Methylene blue was injected into the buttocks of non-pregnant and pregnant women, women in labour or suffering from eclampsia or albuminuria complicating pregnancy. The time it took to appear and the rate and regularity with which it was eliminated in the urine was noted, and the following results were obtained by Oliver:—In pregnancy, labour and 16 cases of eclampsia the elimination was deficient. In the puerperium it was increased. In 12 cases of eclampsia it was not diminished. In pregnancy complicated with albuminuria the results were contradictory. The methylene blue test therefore yielded no information capable of use clinically either in diagnosis, prognosis or treatment.

How is the toxæmia caused? This can be discussed under the following headings:—Kidney, liver, thyroid, intestines, fœtus, microbes, placenta.

Kidney. If this organ is injured then waste products cannot be eliminated properly, and consequently they circulate in the blood.

1. It is possible for the kidney to be damaged by pressure on its vessels or ureter. Possibly on rare occasions that may be a contributory factor.

2. The kidney can be damaged by pre-existing chronic nephritis due to some ordinary cause or a previous attack of eclampsia. As a rule eclampsia is rare in this class of case, but it does occur, and it may be in these cases the kidney is primarily responsible, that is, if the woman had had a healthy kidney the extra amount of poison which appears to be normal to pregnancy could have been eliminated.

3. The kidney in by far the greatest majority of the cases is damaged by the poison which is circulating in the blood and which damages it among other organs. It is not absolutely necessary, however, that the kidney should be diseased since cases are reported

where they have been found quite healthy, and some organ, such as the liver, turns out to be the particular agent at fault.

Liver. Next to the kidney, the liver is the organ which is most often diseased, and when that disease does appear the changes are very marked and striking. Many cases of eclampsia, both pathologically and clinically, resemble acute yellow atrophy. Acute yellow atrophy especially affects women and in a considerable percentage of cases it affects pregnant women; many cases being complicated with convulsions; whilst some cases of eclampsia are complicated with jaundice.

Bouffe de St. Blaise points out that the liver has a triple rôle—(1) it collects toxins to turn them into the blood or excrete them into the bile; (2) transforms other foreign poisons in a similar manner; (3) through the antiseptic properties of bile it modifies the intestinal fermentation, and he thinks that the liver changes represent the primary lesion of the disease which is due to impaired hepatic functions, "hepato-toxæmia." With a large increase in the toxins the liver may be damaged, fail in its task and the toxins will consequently collect in the blood.

Thyroid. Lange examined 133 women during the last twelve weeks of their pregnancy with special reference to the size of the thyroids, and found that in 81·2 per cent. the thyroids were enlarged. When the women were given iodo-thyrin the gland got smaller, only to enlarge again when the drug was discontinued. From this it was evident that the cause of the hypertrophy was to increase the amount of iodo-thyrin. In 18·8 per cent. (22) there was *no* enlargement; 16 of these had albuminuria with casts and six had eclampsia.

From this Nicholson has formulated a theory that eclampsia is due to an insufficiency of iodo-thyrin, which substance is secreted by the thyroid gland to aid the metabolism of nitrogenous substances.

In the absence of a sufficient quantity of iodo-thyrin the metabolism of nitrogenous substances is not completed up to the stage of urea formation, consequently a toxæmia results.

There is much evidence, both clinical and experimental, to support this theory:—

A patient with symptoms of eclampsia is placed on a milk diet and kept absolutely at rest. She gets better. Why? Because a milk diet does not require so much iodo-thyrin, whilst, on the other hand, a meat diet yields too little iodo-thyrin and at the same time yields too little iodine for the manufacture of a fresh supply. On two occasions, when pre-eclamptic symptoms were being kept

in check by milk, the patients ate pork secretly and eclampsia supervened (Nicholson).

Hergott reports a case of eclampsia in a Cretin, æt. 18, who looked æt. 11. Before the birth of the child she had twelve fits, coma not complete, after the birth eight fits, and she recovered quickly.

Bensen finds that in some cases of death after thyroidectomy the renal tubules are blocked by a cylinder of colloid substance very similar in appearance to that which has been described in the kidneys of fatal eclampsia.

Verstraeten and Vanderlinden report the case of a cat whose thyroid was removed in 1892. In 1895 she became pregnant. With the onset of labour the cat had fits, became comatose, gave birth to a dead kitten, and then recovered.

Riverdon and Kocher have both drawn attention to the fact that after complete thyroidectomy, in Myxœdema or Cretins a toxæmia may supervene causing convulsions, also the symptoms of a typical attack of eclampsia can be produced by the removal of the complete thyroid system in animals.

According to Nicholson the iodothyrin affects the kidneys in various ways—(1) it exerts some specific action on the kidneys; (2) on account of its diminution it allows toxins to be formed which damage the kidney; (3) it prevents the formation of urea, and as urea is a powerful diuretic it decreases this stimulus; (4) it is a marked vaso-dilator, and so maintains renal activity, since if it is absent it allows the secretion of the supra-renals, to which it is antagonistic, to come into action leading to spasm of the renal arteries which may arrest the renal secretion.

Intestines. Most women suffer from constipation, and more especially those that are pregnant. Constipation leads to retention of toxic matter and the quantity of albumen in the urine can by purging be diminished. The intestines might be a primary or secondary cause—primary when in cases of constipation toxins are poured into the blood instead of being expelled; secondary when, with a liver already diseased so that its biliary function is altered, the absence of a proper supply of bile to the intestine favours fermentation and putrefaction with consequent absorption of toxins. Constipation will cause fits in babies, and intestinal putrefaction often predisposes to epileptic attacks. Budin has shown that the poison absorbed from the intestinal tract stands in close relation to the toxæmia of pregnancy, and Braun had a well-marked case in a patient seven months pregnant, who died of pulmonary œdema after labour. The urine contained casts and

albumen. Paultauf made the *post-mortem* examination, and found a fatty liver, fluid blood, nephritis and cerebral œdema with multiple rupture of capillaries in the viscera. Savory reports a very striking case of eclampsia complicated with constipation and the most foul smelling fæces, which was cured on thoroughly scouring the bowels.

A review of the evidence therefore as far as we have gone seems to suggest that there are different varieties of eclampsia just as there are different varieties of puerperal fever—in other words, that eclampsia may be primarily due to a *renal toxæmia*, an *hepatic toxæmia*, a *thyroid toxæmia*, or an *intestinal toxæmia*, a failure of any of these organs to perform their functions properly resulting in the accumulation of the particular waste products they customarily deal with and a consequent general poisoning of the body, so that all the organs are more or less affected, and eclampsia results.

Fœtus. It is supposed that in some women the fœtal waste products accumulate to such an extent that the kidney is damaged, and consequently unable to secrete them, and the following facts have been adduced in favour of this theory:—

1. In by far the greatest majority of cases eclampsia occurs after the fifth month, that is, after there has been a long while for these waste products to collect.

2. Convulsions as a rule cease soon after the birth of the child.

3. Convulsions and albuminuria have been found to subside after death of the fœtus and before delivery.

4. Baron and Castaigne find that toxins injected into the fœtal circulation poison the mother, and that the transmission of poison injected into the fœtus ceases immediately on its death.

5. Wilke, Woyer, Schmidt, Dienst have all reported cases in which the child had fits after its birth, and in many of the fœtuses the characteristic lesions were found *post-mortem* to resemble those found in the mother.

6. There is increased liability to eclampsia with twins.

It is a fact, however, that women after nephrectomy can pass through pregnancy and labour without having albuminuria or showing the least symptoms of eclampsia although the burden on the remaining kidney must be twice that of normal cases, and one can hardly imagine that the fœtal waste products would equal this. Then again the fœtal lesions can very well be explained on the assumption that a poison originating in the mother was circulating through the fœtal blood.

Lastly, there have been several cases reported in which eclamptic

convulsions have ceased during pregnancy, the fœtus remaining alive, and the woman going to full term without further trouble.

Microbes. Délore and Rodet first suggested bacterial invasion as a cause of the toxæmia. Doléris and others have all cultivated bacteria from the blood, urine and placenta of eclamptics, but the value of their results is very doubtful, differing as they do so markedly.

Levinowitsch examined the blood in 44 cases and obtained 25 complete cultures of a diplococcus, which when injected into guinea-pigs produced acute anuria, hæmorrhagic endometritis and tetanic spasms. In several of the cases the germs were also found in the fœtal blood.

Other observers failed to find any bacilli.

Müller asserts that Eclampsia is a general intoxication caused by a bacillus within the uterus. As it may come on several days after labour it cannot be due to the fœtus, and as it only occurs in pregnant, parturient or puerperal women the seat of bacterial invasion must be the uterus. He supposes that the bacteria gain entrance before pregnancy, remain latent during the early months and during the later months produce poison of high virulence. Albert, under the heading "Latent Necrobic Endometritis," argues on similar lines that the poison is due to bacteria. In connection with this it has been pointed out that any disorder caused by bacterial invasion predisposes to toxæmia in pregnancy.

The Infectious Fever Theory. Stroganoff points out that eclampsia is characterised by fever, immunity from another attack, a partiality for primiparæ and marked variations in its intensity. Some years there are very few cases, other years very many. It is particularly common under conditions of overcrowding and in lying-in hospitals. It has increased in frequency in recent years, is transmitted from mother to child. Two or three cases will often occur in hospital together or be admitted from the same neighbourhood. Patients in hospital will be attacked after the visiting physician or nurse has seen a case outside. The disease is widespread, involving many organs, and the *post-mortem* rise in temperature is peculiar to infective disease.

Kedarnath Das states that in Calcutta he has often seen two or three cases together, and once five in 30 hours, and a most marked example of this occurred in the Edinburgh Maternity Hospital, where between November 1st and December 6th, *i.e.*, 36 days, there were 37 confinements and six eclamptics, whilst in addition five of the

remaining cases suffered from albuminuria with pre-eclamptic symptoms.

PLACENTA. In albuminuria a diseased condition of the placenta is frequently met with, and at times there is pathological infarction of a very extensive character, and as having some bearing on the theory that the fault lies with the placenta it may be pointed out that not only is the fœtal mortality very high, but also, as Wippermann showed in 1899, if the fœtus is born alive it is not properly nourished and is below the normal weight.

Bulius and Falk noted a marked proliferation of the syncytium in the placenta, which they considered characteristic of the disease, but Williams and other investigators have been unable to verify their results. The thrombi which are found in the organs *post-mortem* are now known to be composed of chorionic epithelium (syncytium and Langhans' layer), and this at any rate is evidence that some portion of the placenta gains entrance to the maternal circulation, although this is said to occur in normal pregnancy (Paten).

Granted then for the purposes of this paper that the poison may arise in one or other of these ways, the next question which naturally presents itself is, *What is the poison?* Unfortunately this is unknown, but the following have been held by different observers to be directly responsible:—Urea, ammonium carbonate, carbamic acid, xanthin, creatin or creatinin, urobilin, peptones, globulins, leucomaines, ptomaines, a placental ferment, acetones.

Urea. One of the most striking facts in connection with eclampsia as demonstrated by Herman is that the quantity of urea is markedly diminished, to increase again to the normal on recovery of the patient, whilst long before this, in 1851, Frerichs had pointed out some striking points of resemblance between uræmia and eclampsia, which were further emphasised by Braun in 1857. But when these two conditions in the light of recent knowledge come to be considered more carefully marked differences will be found.

Experimental evidence shows that urea is not the poison, for although the fact that dogs fed on urea with plenty of water have no fits, whilst if the water is left off they have fits seems in favour of urea being the poison (Voit), the later experiment of injecting urea into the veins of dogs whose ureters have been ligatured, and finding that death did not take place so rapidly as when all the solid constituents of the urine were injected under similar conditions, proves the reverse; urea, in fact, is not a poison but is the finished product of proteid metabolism and acts as an index of such.

Ammonium Carbonate. Frerichs and Spiegelberg argued that eclampsia was due to the circulation in the blood of this substance which is a decomposition product of urea. Many people have tried to discover it in the blood and have always failed.

Carbamic Acid. Ludwig and Savor thought that this substance, a preliminary stage of urea, was the poison.

Xanthin, Creatin and Creatinin. Have all been held responsible. Zweifel and Dührssen laying special stress on the retention of creatin and creatinin in the kidneys of the pregnant patient.

Peptones. Thomson examined the urine of 23 pregnant and puerperal women for this substance with negative results.

Globulins. Kollmann, from the fact that the blood of eclamptics contains an unusual amount of fibrino-plastic matter, thinks that these may be the cause. His results have not been confirmed.

Leucomaines. These are the alkaloidal products of physiological change, the intermediate products of metabolism, due to the activity of the normal tissues and as such distinguished from ptomaines, the products of putrefaction. Massen suggests that they are due to the liver being unable to oxidise them on account of disease and the kidney being unable to secrete them for the same reason. This view lacks confirmation.

Ptomaines. Poisons resulting from failure in its proper functions of the intestine and liver. The evidence in support of this poison has already been discussed.

Acetones. Stumpf concluded that the poison was some non-nitrogenous body since leucin and tyrosin had been found in the liver and methhæmoglobin in the blood, and was inclined to think it was acetone more especially as he had detected it in the expired air and urines of eclamptic patients.

Schaeffer has shown that if toxic doses of acetone are given to animals convulsions, coma, and depression result comparable to eclampsia.

Costa finds that the amount of acetone is greater in the pregnant than the non-pregnant and that this increase is especially marked in prolonged labour.

Audibert and Barraja regarded its presence as due to several causes such as labour, eclampsia, and dead fœtus.

Urobilin. Edsall found that as an index of danger this substance was of no value. In half the cases he examined it was in excess; it was present in one case of eclampsia and absent in two cases of severe albuminuria. It did not cause the death of the fœtus.

Merletti finds that during the last two months of pregnancy

the quantity is three times as great as in the non-pregnant and with death of the fœtus there is a marked increase.

Syncytiolysin (a placental ferment). Scholten and Veit state that when certain cells are introduced into the living blood a substance is formed there which fixes these cells to the red blood corpuscles. According to Ehrlich part of this substance enters the serum and forms an antitoxin which tends to destroy the foreign cells.

When villi (syncytium and Langhan's layer) became deported into the material circulation the result will be the formation of a substance injurious to these cells which may be called a *syncytiolysin* and by a series of experiments they endeavoured to prove the presence of this not, however, very satisfactorily.

Veit and Scholten, Schmorl and Weichardt, and Liepmann regard eclampsia as an auto-intoxication due to a poison of syncytial origin, which acts by causing solution of blood corpuscles and damaging the renal walls, thus producing the thrombi which are so common in the liver and brain.

Bandler also thinks that syncytiolysin is the poison, and in a review of the subject notes the following:—

1. The placenta is a gland giving off into the maternal circulation an enzyme from the trophoblast and syncytial cells. This may be called the fœtal enzyme.

2. The ovary is an organ furnishing an enzyme which has among its attributes the property of resisting or modifying the action of the fœtal enzyme. This may be called the maternal enzyme.

3. A mal-secretion of the fœtal enzyme or a relative mal-secretion or insufficiency due to the action of the maternal enzyme explains the lesions of eclampsia.

Politi made extracts from human placenta, filtered and sterilised them, and injected them into rabbits, and found that in some cases the rabbits died with short spasms and great prostration. He found that the toxicity of the placental extract varied according to the maternal condition, that it was least in the placenta of healthy women and most in those of eclampsia and that albuminuria increased its toxicity.

How does the Poison cause the Convulsions?

1. By direct action on the nervous system.
2. By causing anæmia of the brain.
3. By causing œdema of the brain.

Direct Action on the Nervous System. When a frog is drugged with strychnine its nervous system is so exalted that the slightest reflex stimulus will send it into tetanic spasms. May not the poison in eclampsia affect the woman in a similar way? Those holding this view regarded the uterine contractions as the stimulus. They appear at the fourth month, before which eclampsia is very rare; they are strongest in labour, at which time eclampsia is by far the commonest.

Blumreich and Zuntz, noticing that the convulsions in eclampsia largely cover the motor area, trephined rabbits over the motor area and applied creatin to the brain. They found that convulsions were more easily produced and the quantity of poison necessary to produce a convulsion two-thirds less in the pregnant rabbit than in the non-pregnant.

Anæmia of the Brain. The poison is supposed to cause contraction of the cerebral vessels with a resulting anæmia. The theory is founded on the following facts:—

1. On *post-mortem* examination the brain looks pale. Herman argues that this depends on whether the chest is open and the blood let out of the great veins before the skull is opened.

2. That the face is pale at the commencement of the fit. In syncope, however, the face is very pale, but there is no fit.

3. Kussmaul and Tenner showed that in animals ligature of the carotid and vertebral arteries produces fits.

This view has very few supporters, since neither the *post-mortem* records or the appearances of the patient during a fit in any way suggest anæmia.

Œdema of the Brain. The blood pressure is raised by the hypertrophied heart in normal pregnancy by the uterine contractions and by the action of the toxins on the vaso-constrictors.

Tridodani points out that one of the most valuable signs of a threatened attack of eclampsia is a change in the tension and rapidity of the pulse.

Traube-Rosenstein argued that the fits were due to an increased blood pressure together with an hydræmic state of the blood due to loss of albumen. As a result of this œdema of the brain supervened, and this in turn compressing the vessels caused anæmia which caused the fits.

Falk found, on experimenting with animals, that there was congestion of the brain and not anæmia.

If this view were correct one would expect that in those cases where œdema was the greatest the fits ought to be most marked, and

yet the reverse is the case; and in chronic Bright's the fits are commonest when there is but little œdema.

From all of which it will be gathered that although some of the work done on eclampsia is very suggestive we are at present unhappily ignorant of its true cause.

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REVIEW OF CURRENT LITERATURE.

OBSTETRICS.

Two Cases of Spontaneous Delivery Occurring in Elderly Primiparæ the Subjects of Multiple and Intra-Pelvic Fibroids.

LEPAGE (M. G.). *Comptes Rendus de la Société d'Obstet. de Gynécol. et de Pœdiatrie de Paris*, Oct., 1903.

CASE I. A woman, aged 57 years, was admitted into the Clinique Beaudelocque on July 22, 1903. At this time she was eight months pregnant, the child was living, the presentation by the vertex, but the head was still above the brim. At the fundus of the uterus a pedunculated fibroid the size of an egg was felt, two others were situated on the anterior wall, and Douglas' pouch was occupied by a fibroid the size of an orange attached to the posterior aspect of the uterus on its right side. On September 1st the patient suddenly lost a considerable quantity of blood; there were no uterine contractions and no shortening or dilatation of the cervix. The fœtal heart sounds could still be heard, and appeared quite natural. An hour later pain came on, the membranes ruptured and liquor amnii, free from admixture with blood, escaped. The head engaged, but the fœtal heart sounds became irregular, and finally ceased. On examination the vagina was found to be full of blood-clots. A hot vaginal douche was given, the pain became more regular and the hæmorrhage ceased. During the course of labour the tumour was gradually drawn up out of the pelvis, and delivery was easy. It was believed at first that the hæmorrhage was due to a low implantation of the placenta, but an examination of the child and membranes revealed a very interesting condition. The muscles were pale and bloodless, the great vessels of the thorax and abdomen and the sinus of the dura mater were almost empty. There was no organic lesion of the brain. The insertion of the cord into the placenta was velamentous, the membranes showed two apertures, a very large one through which the child had escaped, and a smaller one five centimetres in diameter; at the edge of this smaller opening was a vessel, a little thicker than a match, completely torn across; by injection it was found to be a vein. It seems certain that the hæmorrhage which occurred at the beginning of labour was from the velamentous part of the cord, and that, although the vessel

appeared to be small, it was sufficiently large to have caused the death of the fœtus. This explanation may be objected to on the grounds that it is more probable that the vessel was torn across by traction on the cord at the moment of delivery, but the placenta was delivered naturally and no traction was made upon the cord for this purpose.

Case II. A primipara, aged 36, was seen for the first time in June, 1903, at that time advanced six months in her pregnancy. A month previous to that date she commenced to suffer from pain which radiated from the region of the rectum. On examination the child was found to present by the head, and several fibroids were felt in the uterine walls. *Per vaginam* the cervix was drawn up behind the symphysis pubis, and a fibroid tumour the size of a fœtal head occupied the whole of the pelvic excavation. There seemed little chance of delivery occurring spontaneously, but it was decided to allow the woman to go to term and to interfere only if it became necessary. Labour commenced on September 12th, but the child had changed its position, so that it now presented by the breech; the progress was rather slow, but gradually the tumour was drawn up above the pelvic brim, so that its lower extremity could be felt above the promontory. By the time the tumour was drawn up the cervix had dilated only to the size of a franc. Two hours later the membranes ruptured spontaneously. Three hours after this the cervix had become fully dilated, and as progress was very slow a leg was brought down and the child delivered. During this procedure a complete rupture of the perineum occurred. There was no post-partum hæmorrhage, and the puerperium was normal.

The author points out that long ago Tarnier stated that he considered breech presentation particularly favourable to the ascent of a fibroid, and concludes, " Without doubt ascension of the fibroid is not constant, but cases such as these which I have just observed ought to make us very careful of the view we take as to the indications for operation during pregnancy on women who have uterine fibroids."

In the discussion which followed M. Pinard said :—" I desire to add some further information about the two patients whose histories M. Lepage has just related to you. He has not laid sufficient stress on the condition of the women when they entered the Clinique Beaudelocque nor of the treatment which was there followed. These women, with the uterus crowded with fibroids, suffered terrible pain, and complained continuously. I believe that many surgeons, had they examined at that moment, would have thought, in view of the

general bad condition of the patients, that the time had come for surgical interference, and would have performed extirpation of the uterus. I ordered these women complete rest in bed, a milk diet, and regulated the urinary and intestinal functions. Little by little the pain passed away, there has been no hæmorrhage, and in the uterus of these elderly primiparæ, crammed with fibroids, the children have developed sufficiently to be born, of average weight, at full term."

HERBERT WILLIAMSON.

A Case of Labour Complicated by a Submucous Myoma.

EKSTEIN. *Monats. für Geburts. und Gynäk.* Bd. 18, Ht. 5.

As a rule conception is difficult in myomatous uteri, and especially so when a submucous myoma is present. If conception occurs under the latter circumstances as a rule abortion takes place. However, if abortion does not take place, the increased vascularisation of the uterus induces a rapid increase in size of the tumour, and so this cannot avoid being an important cause of obstruction to labour if situated anywhere near the pelvic inlet. The dangers will include those of exhaustion from long-continued labour, infection during and after the labour, and rupture of the uterus either by direct violence (pressure of child between tumour and uterine wall) or spontaneously. The author's case was that of a 11-para, who had had four labours and six abortions. The present labour began on May 8th, 1901, with rupture of the membranes, proceeding, however, very slowly with strong pains at long intervals. Nothing occurred of importance until May 14th, when the cord prolapsed; and on the 17th, on account of a rise of pulse and temperature and great abdominal distension from meteorism, it was determined to empty the uterus. On examination it was found that the fœtal head was fixed in the middle of the pelvis, the cervix not completely dilated and the abdomen so distended that nothing could be made out by palpation. Clearly some form of obstruction to labour was present, but what it was could not be determined. Perforation anyhow was the only method of treatment which seemed suitable. This was done, and the head was easily delivered, but difficulty was at once experienced with the shoulders, which were only delivered after considerable traction. On attempting to remove the placenta by the hand the cause of the obstruction was found in a tumour the size of a fœtal head, evidently a myoma, which sprang from the left side of the uterus just above the internal os and projected into the uterine cavity. On feeling for the placenta coils

of intestine were found in the uterus, and a rupture through which they came was discovered on the right side of the fundus. The rupture easily admitted the whole hand. The placenta was still in the uterus and was easily removed. As there was no serious hæmorrhage, and as there was evidently already infection present, it was determined to replace the intestines through the rent and then to tamponade the rent and uterus. This was done without difficulty by drawing down the uterus with a volsellum and using a posterior speculum. About five metres of iodoform gauze was used to tamponade the rent and fill up the uterus. For three days there was some rise of temperature, but after evacuation of the bowels the temperature subsided and the meteorism disappeared. After a week the tampon was gradually removed; at the end of a fortnight it was completely removed. There was an exudate on the sight side as big as a fist, but this was painless and gave no trouble. A year and a half later the tumour was much smaller and gave no indications for a radical operation.

The happy result in this case must be put down to the fact that no large blood-vessel was opened by the laceration in the uterine wall, and the infection must have only been slight. No doubt the rent could have been avoided if the cause of the obstruction had been diagnosed. In all probability it was the direct pressure of the shoulders passing the tumour which caused the rent on the opposite side of the uterus. By evisceration and cleidotomy the size of the shoulders could have been lessened and so perhaps the rupture avoided.

THOS. G. STEVENS.

Pre-Sacral Tumour Obstructing Labour.

KEITLER (HEINRICH). *Zentralblatt für Gynäkologie*, 1903, No. 46. From the Chrobak-Festchrift I.

THE patient was aged 27; she had had four children. In September, 1901, she had a very difficult delivery in which it was necessary to perform internal version on account of obstruction caused by a growth, which was felt after delivery to extend from the sacrum forwards into the false pelvis. The vagina was ruptured very extensively, and there was great trouble with the after-coming head. On August 27th, 1902, after four hours of fruitless labour pains, Cæsarean section was performed, a living child was delivered, the uterus was amputated, and the cervical stump covered by peritoneum.

The patient died next day. The temperature had been 39°C., and the pulse 144 beats per minute before death. There were numerous secondary growths in the liver, the largest measured 2·5c.m. in diameter. The true pelvis was filled by a retro-peritoneal tumour; it had a nodular surface and a moderately firm consistence. On the anterior surface of the tumour lay the sutured stump of the amputated uterus, which was not inflamed. A part of the tumour grew from the interior of the sacrum; it spread to the tissues of the right ischio-rectal fossa. The tumour was somewhat spherical in shape with protruberances on its surface. Its diameter measured 14cm. The mass had an alabaster or white-red marbled appearance, from the presence of hæmorrhage and small veins full of blood. Transverse section through the sacrum showed that the periosteum of this bone and that of the ischium were involved in the growth; the latter, indeed, had eaten into the sacral vertebræ, but the vertebral canal and the nervous structures (chorda equina) were normal. This growth, which had taken at least two years to develop, showed a resemblance in its minute histology to the so-called sarcomatous glioma (glioma sarcomatodes). Its sarcomatous nature seems indisputable, but the diagnosis of glio-sarcoma seems doubtful. One of the writer's arguments in favour of the presence of "glia" was the peculiar localisation of the tumour, and he states this after telling us that all the nerve structures are normal in the sacral canal! From the brief account given it seems more probable that the sarcoma was undergoing myxomatous degeneration.

CUTHBERT LOCKYER.

A Case of Hebotomy.

ARNDT (GUSTAV). *Zentralblatt für Gynäkologie*, 1903, No. 49,

IN Band xvii., Heft 5, of the *Monatsschrift für Geburtshülfe und Gynäkologie*, Baumm described two cases of lateral division of the pelvic arch which ended fatally. This writer concludes that the operation has no advantages over symphysiotomy. Since the *pros* and *cons* of the more recent lateral section are not yet thoroughly gone into, and the number of operations upon living subjects are as yet quite small, Gustav Arndt thinks the following successful case will be of interest:—

The patient was aged 36 years. She had had two children. Menstruation started at 19 years, and was regular. Two and a half years ago a child was born in the footling presentation with surgical aid. The last period was in December, 1902. During pregnancy

there was no pain complained of. Labour started on September 13th, 1903. The membranes ruptured ten hours later; pains were strong, but the head did not descend. On admission the temperature was 37·2°C., and the pulse 88. The urine was free from sugar and albumen. The obstetrical measurements were:—Inter-spinous 26·5cm., inter-cristal 29cm., external conjugate 19, true conjugate 8·5, inter-trochanteric 31cm. The child lay in the first vertex position. The head was in the right iliac fossa; the uterus was contracted upon the child and was tender to palpation. The heart sounds were loud and strong. The os was the size of a five-shilling piece; the liquor amnii was foul; the head seemed large. On the day after admission severe labour pains set in, and after they had continued for six hours the head became fixed in the pelvis; then the fœtal pulse became slower, and the patient's temperature rose to 38°C. Forceps were applied to the head as it lay in the brim, and the patient placed in Walcher's dependent posture, but neither this, nor Hofmeier's method succeeded in drawing the head through the pelvic inlet. As the woman desired a living child the alternative procedures were Cæsarean section or the enlargement of the pelvic girdle. The foulness of the liquor amnii contraindicated the former, as also did the rise in temperature. Hebotomy, as described by van de Velde, was accordingly carried out. An incision was made from within outwards over the left pubic spine down to the junction of the middle and lower thirds of the labium majus, and continued directly down to the bone. This led to very little hæmorrhage, requiring only two pressure forceps to stop it. After freeing the bone from the tissues above and below, and with two fingers in the vagina, the bone was in a moment divided by Gigli's saw. The corpus spongiosum and the bone bled freely, and this required pressure by tampons. After section the bony surfaces gaped widely enough for the introduction of three fingers. The child was now easily delivered by forceps. During the delivery the pelvis was compressed from side to side by an assistant. The child was a large girl, weighing 4,000 grammes. It was somewhat asphyxiated, but was soon restored. The placenta gave no trouble. The genitals and wound were cleansed; the periosteum was sewn up with catgut, and the soft parts closed by silk ligatures. A drain of iodoform gauze was placed in the lower angle of the wound.

A retaining catheter was used, and sandbags placed on either side of the pelvis. Recovery was uneventful. The drain and the catheter were removed on the third day. The stitches were removed ten days after operation. On the sixteenth day the temperature

rose to 38°C. owing to a small mammary abscess. Active and passive movements of the left lower limb were practiced on the seventeenth day. The patient got up twenty-five days after operation. She walked without pain and showed no sign of limping. On pressure over the wound callus could be felt and the area of bony union was tender, but there was no abnormality of movement. The writer claims that this procedure will find a permanent place among obstetrical operations.

CUTHBERT LOCKYER.

Rupture of the Symphysis.

KAYSER. *Archiv für Gynäkol.*, 1903. Bd. 70, Heft 1.

IN 30,000 labours in Schauta's and 64,149 in Chrobak's kliniks this accident occurred three times. It did not occur in 42,040 cases under Gusserow, and since the year 1876 it has not been observed by Ahlfeld. About 130 cases have been described. The writer describes a case which has at length occurred in Gusserow's klinik. The patient was a primipara, 26 years old. When she sent for a doctor she had been in labour 48 hours, and the membranes had been ruptured 37 hours. Inter-spinous diameter, 25cm.; inter-cristal, 28cm.; inter-trochanteric, 31cm.; external conjugate, 20cm. During the examination, the fœtal heart rate fell from 170 to 70 per minute, and a quantity of meconium escaped. The anterior fontanelle was lower than the posterior, and was on the right and anterior. The doctor therefore proceeded to deliver the child with axis-traction forceps. When traction was applied a cracking sound was clearly heard. Delivery was completed after considerable difficulty. The child was mature, and the circumference of its head was 36cm. There was a large vaginal tear and a diastasis of the symphysis.

The patient when admitted to hospital could not move her legs. Passive movements caused severe pelvic pain. The legs lay rotated outward, abducted and slightly bent at the knees. The vagina was transversely torn above the urethra, the breadth of the wound being $3\frac{1}{2}$cm. After removing blood-clot the ends of the pubic bones were felt 3cm. apart. The patient was able to pass water. With difficulty the urethra, which was retracted into the wound, was catheterised, and it was then attached to the anterior vaginal wall, the wound being lightly packed with iodoform gauze. Attempts were made to secure apposition of the separated structures by means of plaster bandages. These failed, and the parts having been exposed four silver-wire sutures were inserted. The operation wound was closed,

the cave of Retzius being drained by a rubber tube for 14 days. A plaster bandage was again applied, and was kept on for some time, the patient not being allowed to walk for five weeks. Seven months later two silver stitches were removed, as they had worked through the fascia and were causing pricking sensations. There was no trouble in urination. The patient walked perfectly well and was free from pain and fit for work.

W. E. FOTHERGILL.

Rapid Mechanical Dilatation of the Cervix in Midwifery.

BARDELEBEN. *Archiv für Gynäkol.*, 1903. Bd. 70, Heft. 1.

THE writer explains that natural dilatation depends on two factors—the eccentric upward pull of the retracting uterine muscle and the downward push of the bag of waters, or of the presenting part of the fœtus. Retraction alone can doubtless produce a certain degree of dilatation, but without uterine action there can be no "push" of the presenting part. The second factor therefore never works alone in nature. It can, however, be imitated artificially by the use of traction upon the stalk of a non-elastic bag inserted within the cervix.

In artificial dilatation the object should be to imitate the physiological process as closely as possible. As a stimulant to uterine action and as a representative of the bag of waters, the non-elastic bag is preferable to mechanical dilators of the "Bossi" type. This being the case, the writer has set himself the task of discovering whether there is any real necessity for, or any advantage to be gained by, the use of metallic dilators of this kind. He has employed these instruments in ten cases, which are fully reported and analysed in the paper under notice.

In this series of cases labour pains were absent or slight during dilatation, the value of the metallic dilator as a stimulant to uterine contraction being apparently very small. Contraction of the cervix was very rapid after the termination of rapid dilatation. If the os is to remain open during subsequent manipulations it must be dilated very slowly. As rapidity is the main advantage claimed for Bossi's dilator this observation detracts from the value of the instrument. When the cervix was already taken up, small tears were produced during dilatation. When a definite cervical canal remained the tears were more serious, their deepest portions being at the upper end of the canal in the region of the os internum. There was thus a marked distinction between those cases in which the cervical canal remained present and those in which it was already obliterated at the commencement of artificial dilatation.

As to the subsequent extraction of the fœtus, the writer records that the cervix was not in any of his cases fully dilated, and that it was very seldom uninjured. It always showed a strong tendency to close again, especially when uninjured. In the presence of deep tears this tendency was not noticed. These conditions had the following results:—Either the cervix was torn during delivery, tears already produced being increased, or else the cervix prevented the passage of the presenting, or captured the after-coming, head. Proceeding to discuss at length the indications for and value of metallic dilators, the writer expresses the opinion that these instruments are in any case either unnecessary or undesirable. When the cervix is dilatable it can best be dilated with the fingers or with a non-elastic bag. When it is not dilatable delivery should be secured by multiple incisions or by vaginal Cæsarean section, and not by making tears whose number, position and severity cannot be estimated beforehand. In a note the writer mentions eight additional papers on the subject which appeared while his paper was being printed, and states that the perusal of these confirms him in the opinions formed from his own observations. (Abstracts of most of the papers referred to have already appeared in this JOURNAL).

W. E. FOTHERGILL.

The Value of Vaginal Cæsarean Section, with Report of Two Cases.

STAMM (M.). *Amer. Journ. of Obstet.*, Nov., 1903.

OVER 60 cases have been reported in which the child has been extracted from the uterus by means of incisions made in the anterior and posterior walls of the cervix and lower uterine segment. The author of this paper reviews a number of these cases, and records two in which he himself performed this operation. He accepts Dührssen's conclusions as to the scope of and indications for this procedure, and summarises them as follows:—

1. Abnormal conditions of the cervix and lower uterine segment (carcinoma, myoma, ridigity, stenosis, partial pouch-like distension of the lower uterine portion).

2. Dangerous conditions of the mother which may be removed or relieved by prompt emptying of the uterus; affections of the heart, lungs and kidneys.

3. Conditions of the mother where death is imminent and can be foreseen.

In Stamm's two cases the operation was performed as a means of rapidly emptying the uterus in patients suffering from eclampsia, and the technique of the operation is described as follows:—The cervix is exposed by a large speculum and grasped on either side of the os by two pairs of forceps. A longitudinal incision is then made in the anterior vaginal wall, down to its reflection on to the cervix, and the bladder separated as high as the os internum; the anterior wall of the cervix is then cut through in its whole length. The upper margins of the womb are grasped by forceps and drawn slightly down, the bladder is still further separated, and the incision continued on into the lower uterine segment. By repeating this manœuvre an incision 8—12cm. long can readily be made under the guidance of the eye and without opening the peritoneum. This incision is usually large enough to admit the hand and to allow of the extraction of a mature child; should it, however, not be sufficient a similar procedure can be followed on the posterior aspect. The edges of the wounds are then brought together by catgut sutures. Both the cases operated upon recovered.

HERBERT WILLIAMSON.

On Secondary Suture of the Perineum during the Puerperium.

ABULADSE. *Monats. für Geburts. und Gynäk.*, Bd. 18, Ht. 4.

UNHEALED lacerations of the perineum, although frequently followed by no particular symptoms, in general lead to such a train of symptoms that operations of a plastic nature have perforce to be performed long after the injury has taken place. Of these symptoms vaginitis, descent of the vaginal walls and uterus, with ascending infections of the generative system are the common ones, and could be prevented if the laceration had been repaired at once, or at all events some time during the puerperium. The possibility of obtaining a good result from suture of the perineum some days after it has been lacerated was demonstrated as far back as 1849 by Maisonneuve, who sutured two such cases on the 10th and 12th days respectively after labour. Soon after this Nélaton operated on similar cases on the 4th and 7th days, with good result. Since this time many important authorities have written confirming Maisonneuve's original observations, and in all the writer has collected 118 cases from the literature of the subject contributed by various operators. To these are added 11 cases described by the author. Of these 137 cases two died, one of puerperal sepsis, and the other of erysipelas migrans. In 126 cases

the secondary suture was perfectly successful, and the time of performance of the operation varied from the 2nd to the 28th day after delivery. The operation was partly successful in five cases and unsuccessful in four only. In some of these cases the granulations covering the lacerated surfaces were simply removed with a sharp spoon before suturing, in others the wound surfaces were refreshed by dissection, in others simply by energetic rubbing with cotton wool. Good results were obtained by all these methods. The author recommends the following technique:—After disinfection of the genitals and vagina he applies tincture of iodine to the granulation tissue so as to destroy as many bacteria as possible, then puts in the deep sutures, and before tying them scrapes away the granulations with a sharp spoon. The sutures are not removed until after five or six days. In the eleven cases described there was no rise of temperature recorded, and all healed completely without a bad symptom. If there has been any infection of the wound or ulcerative process it is necessary to wait until granulation tissue has appeared before attempting to suture the surfaces. On the other hand, there must not be any real scar tissue formed if a good result is to be expected; in general, up to four weeks after labour a good result may be looked for.

As conclusions the author draws up the following:—

1. Secondary perineal suture must be carried out as a prophylactic against many gynæcological complaints.

2. The technique is simple, devoid of danger, and as a rule is followed by a good result.

3. Secondary perineal suture is obligatory on every surgeon who sees a patient with an unhealed perineal laceration.

THOS. G. STEVENS.

A Case of Hæmatometra following Labour.

FIEUX (M.). *Comptes Rendus de la Société d'Obstet. de Gynécol. et de Pœdiatrie de Paris*, Oct., 1903.

HÆMATOMETRA due to cicatrical contraction of the cervix from traumatism at the time of delivery is rare, but the following case proves the possibility of such a condition:—

Me. G., aged 37 years, was delivered of a male child at full term. The labour was long and difficult, and eventually was terminated by forceps. The forceps were applied three times, and

on the first two occasions they slipped off with considerable violence; the head presented evidence of severe injuries. The child was still-born. After delivery the midwife noticed numerous tears in the vagina and cervix. The puerperium ran a course almost normal until the tenth day, when the lochial discharge suddenly ceased. The menses did not reappear, and the patient became subject from time to time to severe attacks of pain in the loins. She believed herself to be again pregnant, and sought advice in February, 1902. On examination the uterus was found to be enlarged to the size it normally attains when pregnancy has advanced three and a half months; *per vaginam* scars, the result of old lacerations, were felt in the vaginal walls, but the cervix could not be identified. The diagnosis of hæmatometra was made, and a few days later, when at stool, the patient suddenly passed clots and a quantity of thick, dark fluid blood. Very shortly the pain in the loins recommenced. The uterus was found to be only slightly enlarged, but it was impossible to find the orifice of the cervix even with a fine probe. As there were no urgent symptoms the patient was sent home and told to let M. Fieux see her again when discharge was actually taking place. This happened a few days later, and at this time a minute orifice from which a little blood was issuing could be seen. The opening was enlarged by a bistoury and a large quantity of blood-stained purulent fluid escaped. Hégar's dilators Nos. 4, 5 and 6 were then passed without any great difficulty; the next day Nos. 6, 7 and 8 were passed, and the uterine cavity washed out with a weak solution of formalin, and an aluminium drain passed through the cervix and kept in position by an aluminium pessary in the vagina. Since the dilatation the patient's health has been excellent and she has menstruated naturally.

HERBERT WILLIAMSON.

GYNÆCOLOGY.

On the Curability of Cancer.

LOMER (R.). *Zeitsch. für Geburts. und Gynäk.* Bd. 50, Ht. 2.

IT is generally believed that after an operative removal of cancer any of the cancer cells that are left behind are certain to proliferate and give rise to renewed malignant growth. Every now and again, however, operators are surprised that no recurrence takes place for two, four, or even more years in cases where the whole of the disease was apparently not removed. These cases are usually explained by

supposing that more was taken away than the operator thought, or that subsequent sloughing destroyed any remains of the new growth. Or again the diagnosis is supposed to have been wrong, or the freedom from recurrence is a fortunate accident. Lomer has undertaken an extensive search into the literature of the subject, and has collected from German, French and English special writings 213 cases of carcinoma treated with the cautery, and afterwards remaining free from recurrence for at least two years; included in the series were a large number of inoperable cases. The largest collections are those of Pawlik, Mackenrodt, and Byrne. The experiences of many eminent gynæcological observers are also quoted to show that well-authenticated and scientifically-proved surprise cures are sufficiently common to call for a serious attempt to discover the reason for their occurrence.

The second part of Lomer's paper is an attempt to solve this problem. He points out that under certain circumstances the nutrition of cancer cells may be interfered with so that they degenerate or die. Jensen, who was able to inoculate carcinoma from mouse to mouse through 19 generations, considers that it is highly probable that the contagion is due, not to any cancer parasite or toxin, but simply to a transplantation of cells; these cells, he states, were already dead after having been kept for 24 hours at 37°C., while normal epithelium has been kept for a month in ascitic fluid and has then grown when transplanted. He states, further, that temperatures of 47°C. and upwards kill cancer cells, while epidermis may be kept for 14 hours at a temperature of 50°C. and still preserve its vitality; thus the tumour tissue is less resistent to heat than normal epithelial tissue. These observations suggest a possible explanation of the good effects obtained in the treatment of cancer by the cautery. Lomer next asks how a rise in temperature of the whole body affects cancer, and quotes cases to prove that patients with uterine cancer, who come under observation with the complications of pelvic exudation and fever, live longer than others. The favourable results obtained by the inoculation of carcinoma patients with erysipelas and cultures of streptococci are perhaps to be explained simply by the rise in temperature so caused. It is, on the other hand, a remarkable circumstance that carcinoma patients are little prone to fever, and that septic complications are rare in them. The writer further enquires how far severe loss of blood, such as, for instance, sometimes takes place in operation, is unfavourable to recurrence of cancer, and considers it an open question whether the successes after abdominal radical operations are due to the complete

removal of the glands or to the loss of blood, and suppuration consequent upon a severe operation. It is a matter of common knowledge that in young, healthy and blooming patients cancer grows rapidly and quickly returns after removal, whereas in old, ill-nourished and worn women the course of the affection tends to be much more chronic. He finds cases to support the opinion that when a patient is reduced to the brink of the grave by operation recurrence is less likely to occur, and concludes that profound alterations of the blood, such as occur in fever and after great hæmorrhages, and perhaps also after severe burns, appear to have a curative effect on carcinoma by interfering with the nutrition of the not very resistent cancer cells. Local cancer often shows a tendency to shrink also in conditions that give rise to profound loss of vitality, as, for instance, in the last stages of phthisis, in syphilis, and in advanced malignant cachexia. In this connection the old hunger cure for cancer and the treatment by poisonous agents which cause blood changes, such as arsenic, Chian turpentine, cantharidin, lysol, and especially chlorate of potash, are of interest.

Lomer has been led, by a consideration of all the circumstances, to experiment with a hæmolytic serum in cases of malignant disease of various kinds, and these experiments are still in progress. He suggests that an epithelial serum may also be found that will have a favourable influence in preventing the growth of cancer, and that there may possibly be specific sera for different varieties of the affection. His observations also lead him to suggest regularly repeated cauterisation of any suspicious spots that appear in a scar after operation, and the frequent and systematic application of the cautery in inoperable cases; local treatment by warmth, by sweating, or light baths should be fairly tried; drugs, such as chlorate of potash or arsenic, should be administered for a considerable time; the vagina regularly irrigated with solutions of chlorate of potash; and the effect of injections, as, for instance, of staphylococcus toxins, which cause febrile reaction, should be tried. He insists that cases of surprise cure should not be looked upon merely as lucky accidents, but should be subjected to the most careful scrutiny in the hope of finding out the cause for the failure of growth of the cancer cells left behind.

The third part of the paper deals chiefly with Lomer's personal experiences in the treatment of cancer, including 35 cases in which he has performed vaginal hysterectomy. Seven of his patients were cured, six more than five years, and one three and a half years after the operation. His results appear to be in accordance with general

experience. The paper as a whole is a very suggestive and interesting one, and reflects much credit on the industry of the author. The chief practical conclusion at which he arrives is that a more extensive and systematic trial of cauterisation deserves to be made in cases of cancer. The observation is frequently made that even when, in the first curetting and burning, the cancer appears to be absolutely inoperable, the possibility of a total extirpation may become evident at a second or third use of the cautery. The hopeful tone in which Lomer tackles the melancholy subject of the treatment of cases of advanced cancer cannot fail to be admired.

THOMAS WILSON.

The Abdominal and Pelvic Lymphatics and their Relationship to Cancer of the Uterus.

WAKEFIELD (W. FRANCIS B.). *Amer. Journ. of Obstet.*, Oct., 1903.

THE author has carefully investigated the distribution of the lymphatics of the uterus, both by dissection and by injection experiments. He regards the loose-meshed connective tissue of the endometrium as the commencement of the lymphatic system, and describes definite lymph spaces lined with endothelium situated around the capillaries and glands of the uterus. From these small vessels pass to empty into the perivascular lymphatics, which lie between the outer and middle layers of the muscular wall. Here we find a perfect anastomosis of lymph vessels from all parts of the uterus, and from the lateral aspects of the organ a limited number of large vessels pass, to run through the parametric connective tissue and communicate with the general lymphatic system of the pelvis and abdomen. The lymphatics of the cervix after reaching the periphery become convoluted and coalesce to form two to four large vessels on either side; these pass through one or more small glands situated in the parametric tissue close to the cervix, and accompanying the uterine artery to the lateral wall of the pelvis, cross the hypogastric and obturator arteries and empty into the glands at the bifurcation of the common iliacs. Frequently one or two lymphatics from the cervix enter the utero-sacral ligaments and empty into the sacral glands. The lymphatics from the fundus coalesce into two trunks on each side; these run in the broad ligament between the Fallopian tube and ovary, and then following the course of the ovarian artery reach the lumbar glands. Those from the uterine

horns form two small vessels which accompany the round ligament and terminate in the upper glands of the inguinal group.

We have then to deal with four groups of glands:—

1. The iliac group, a continuous chain extending from the retro-inguinal space to the common iliac vessels, and draining the upper part of the vagina, the cervix and bladder.

2. The sacral group, found on the antero-lateral aspect of the sacrum and draining the rectum and cervix.

3. The lumbar group situated on the bodies of the 2nd, 3rd and 4th lumbar vertebræ and surrounding the aorta and inferior vena cava. This group receives lymphatics from the body of the uterus and the ovary.

4. The inguinal groups (including a gland which lies on the obturator membrane), which drain the uterine cornua.

The investigation of the frequency of involvement of these various groups is beset with many difficulties; all enlarged glands are not cancerous, all cancerous glands are not enlarged, and, further, no gland can be pronounced free from cancer until it has been cut in serial sections and all these sections examined.

Involvement of the parametric tissues probably always precedes involvement of the glands, and in some cases the infection travels by way of the nerve trunks. Recent researches have shown that the perineurium, epineurium and endoneurium of the branches of the sacral plexus may become invaded by cancer cells, which travel thence by means of the lymph radicals and lymph spaces of the nerves. The lamellæ of the nerve sheath become separated by cancer cells which cover the connective tissue membranes in the form of an epithelial layer, and there proliferate.

There is yet another source of difficulty, a lack of knowledge of the meaning of certain microscopic appearances found on examining these glands. In about 12 per cent. of the cases anomalous epithelial formations are seen, most frequently in the form of narrow, branching, gland-like structures, lined with a single layer of columnar epithelium, occasionally ciliated. These are usually situated towards the periphery of the gland, but are sometimes found in the more central parts. Many authorities deny that these structures are carcinomatous on account of (1) the regularity of their structure, (2) the occasional presence of a connective tissue stroma, (3) the occasional presence of cilia, and (4) the fact that the epithelium composing these structures differs from that of the original tumour. But, on the other hand, at the Bettina Pavilion, in Vienna, the pelvic lymphatics in eighty cadavers presenting no

evidences of cancer were cut into serial sections and carefully examined, without revealing in a single instance the presence of these epithelial formations; and the author claims to have found in the same gland many transition forms between these and typical carcinoma; upon these grounds, then, he regards them as early manifestations of cancer. From investigations he concludes that in from 25 to 35 per cent. of cases of carcinoma of the cervix the lymphatics are involved, and devotes considerable space to the discussion of the more radical operations. He admits that at present the complete removal of possibly infected glands is beyond the range of practical surgery, but urges that more extensive operations than those usually performed should be practised. "Vaginal hysterectomy has no place as a curative operation in cancer of the cervix. Nothing but palliative benefits should be expected from it," is one of his conclusions.

HERBERT WILLIAMSON.

On the Co-Existence of Carcinoma and Tubercle of the Uterus.

WALLART (J.). *Zeitsch. für Geburts. und Gynäk.* Bd. 50, Ht. 2.

WALLART has made an extensive research into the literature of this subject, and critically examines a large number of observations; he then relates at length two cases which have already been referred to in the second edition of Kaufmann's text-book on special pathological anatomy. In one of these (Case 2, p. 249) there was a carcinoma developed from the cervical glands, and at the same time a secondary tuberculosis extending from the peritoneum to the tubes and uterus following upon a primary pulmonary tuberculosis; the cervix was also invaded by tubercle. In Case 3, p. 265, at the *autopsy* on a woman, aged 37, who died of chronic phthisis and tuberculous meningitis, an adeno-carcinoma had invaded the whole portio and cervix; in the body of the uterus was found a circumscribed caseous thickening of the mucous membrane, proved microscopically to be tuberculous. Wallart thinks that the concurrence of carcinoma and tubercle in the uterus is not so rare as has hitherto been supposed; the relation of the two affections to each other is probably different in different cases. In the first case just related the chronic progressive tuberculosis probably was a predisposing cause for the development of cancer. In the other case the concurrence was most likely accidental; the tubercle of the body appeared to be of more recent date than the cervical cancer, and was apparently a secondary process

of the same age and duration as the tubercle of the meninges which was also present.

The paper concludes with an extensive list of references, and is well illustrated by three coloured plates.

THOMAS WILSON.

Malignant Degeneration of the Cervical Stump after Sub-total Hysterectomy.

RICHELOT (L. G.). *La Gynécologie*, Oct., 1903.

RICHELOT considers that all that can be said in favour of sub-total hysterectomy can also be said of total hysterectomy. The latter takes no longer to perform and causes no more bleeding. The danger of vaginal infection can be easily avoided. If the vagina is infected so is the cervical canal, and therefore in this case sub-total hysterectomy would be just as dangerous. There is no reason why infection from the vagina should be more likely to occur after total abdominal hysterectomy than after vaginal hysterectomy. Richelot does not wish to belittle the value of the sub-total operation; he thinks it is indicated in cases where the relations of the bladder and ureters are altered by fibroids situated low down, and also in cases where the thickness of the abdominal wall and the fixation of the uterus oblige the operator to work "right at the end of his fingers," and in the small pelvis. As regards technique and immediate results there is nothing to choose between the two methods. But the stump which is left behind may become the seat of malignant degeneration, carcinoma or sarcoma. This is not a common occurrence, but it is met with in a certain number of cases. The mere fact that an operator who has performed 100 sub-total hysterectomies has never met with such a case is no proof that none of his patients have suffered from carcinoma or sarcoma of the stump of the cervix. Richelot has had three cases in his own practice, and has collected ten other well-authenticated cases of malignant degeneration of the cervical stump. Richelot's first case was that of a patient aged 39, with a fibroid uterus reaching almost up to the umbilicus. The abdominal wall was so fat that he had to leave the cervix. Six months later he found carcinoma of the cervix invading the vagina. Whether carcinoma was present at the time or not does not alter the fact that if he had removed the whole uterus the patient would not have been suffering from carcinoma of the cervix six months afterwards. In the second patient, aged 38, there was a large sub-

peritoneal fibroid attached to the body of the uterus which was as large as two fists and contained an interstitial fibroid. There was a hydrosalpinx on each side. The complexity of the operation and the difficulty of stopping the bleeding forced him to leave a portion of the cervix. The raw surface and the cervical canal were cauterised with the thermo-cautery. Three years later he found carcinoma of the cervix invading the vagina.

"The fibromatous uterus is not simply soil on which malignant tumours *may* grow, it is *the* soil on which they *do* grow!" The "fibromatous" condition of the uterus is due to a defect of nutrition, the stages of which form an uninterrupted series, starting with the small sclerotic uterus, going on to the "giant" uterus, "fibromatous" without "fibroids," or containing some nodules as large as hazel nuts lost in the midst of the hypertrophic mass, and, lastly, the ordinary fibroid uterus. To say that "uterine sclerosis" in its diverse forms precedes and induces the most serious neoplasms may seem an exaggeration, but, quite apart from sarcomatous degeneration of fibroids, about which occurrence Richelot considers there is not the slightest doubt, it must be remembered that with "metritis" and fibroids is usually found a change in the endometrium, called by various names. "How often has a histologist called certain microscopical sections 'cancer' and the disease has not recurred, how often has he called them 'metritis' and early recurrence has given him the lie?" This diffuse hypertrophy, which the Germans call "adenoma benignum," remains innocent as long as it is frankly glandular, but it cannot be denied that hyperplasia of uterine glands shows a tendency to malignancy. Is not the condition incorrectly called "adenoma malignum" simply an early stage of carcinoma?

If sub-total hysterectomy is bad how much worse is myomectomy? Here the whole of the diseased endometrium is left behind, and the chances of carcinoma are increased. Richelot does not go so far as to advise a "preventive hysterectomy." He considers myomectomy to be a good operation in certain rare circumstances.

HENRY RUSSELL ANDREWS.

Sarcomatous Degeneration of Uterine Fibroids: Panhysterectomy and Supravaginal Amputation.

EVELT. *Monats. für Geburts. und Gynäkol.*, November, 1903.

AT a meeting of the "Gynækologische Gesellschaft," Munich, last spring an interesting discussion followed the reading of a report of

three examples of sarcomatous degeneration of uterine fibroids. They had been collected out of 120 cases in private and hospital practice; in all the muscle cells, and not the connective tissue, were the seat of the malignant change. In one instance the tumour was a primary (*sic*) melano-sarcoma, a form only once recorded before as developing in the uterus. Diagnosis was not easy; in the first case the fibroid had existed for ten years, and its nature was at once readily recognised, yet the complication was apparently not found out until the operation, nor was the malignant change suspected in the second case till the uterus was amputated. In the third the question of malignancy was raised, and a piece of the tumour was snipped away from the uterine cavity seventeen days before the operation; microscopic sections appeared as though sarcoma might be developing, but the evidence was apparently not conclusive. The first patient was 58, the second 42, whilst the third was only 30. In all three cases there was a distinct capsule indicating that the tumour was originally a fibroid, that is to say, a true innocent fibro-myoma with distinct transition of myoma tissue into sarcoma (the melano-sarcoma is described elsewhere in the report as primary). In the third case, where a piece was examined over a fortnight before operation and appeared chiefly as muscle tissue with but few suspicious cells, the main tumour when removed was found to consist almost entirely of sarcoma cells. Death from recurrence took place eight months after hysterectomy in the first case. In the second, where there was melano-sarcoma, an operation was performed for hernia thirteen months after the removal of the uterus, and, strange to say, the patient was found to be quite free from metastases. The third case was too recent for an after history. Abdominal panhysterectomy was performed in all three cases, the appendages were removed as well in the first and third; it is instructive to remember that they were left behind in the second, the melanotic case, yet there was no recurrence over a year later. Evelt remarked that these cases demonstrated how little we could trust to the innocence of many fibroids that seemed to be ordinary myomata even after microscopical examination of fragments, how difficult was clinical diagnosis and how necessary it was to remove the uterus at once when a myoma suddenly increased in size.

In discussing Evelt's report, Klein considered that the percentage of malignant cases was large considering that the total was only 120, whilst fibroid disease was extremely common. It was still, he understood, customary not to operate on fibroids after the menopause, but Klein maintained that in all such cases the patient should be watched and examined every six or eight weeks so that the tumour might be removed directly it showed signs of increasing in size. Mirabeau related a case where a fibroid had been for fifteen years

under observation and had caused hæmorrhage all the time. The menopause occurred at 51; three years later the patient suddenly died of acute intestinal obstruction. A degenerated myoma was discovered at the necropsy; it had burst into the intestinal canal. In three cases of sarcomatous degeneration Mirabeau found that the sarcoma cells had developed from the connective tissue and not from the muscle cells.

Von Winckel remarked that the prognosis after the removal of a sarcomatous fibroid was unfavourable, for he had observed recurrence and rapidly fatal results two years after operation. He then made a very important statement. Notwithstanding the evidence that undoubtedly sarcomatous degeneration of a fibro-myoma might occur, that complication was so rare that in his opinion it need never deter the surgeon from leaving the cervix. Cancerous degeneration of the cervical stump was likewise too rare to influence the operator about the alternative of panhysterectomy or supravaginal amputation. Von Winckel insisted that the advantages of the latter operation were greater than the risks. He knew of a case where total extirpation had been undertaken, and the unfortunate patient now complained that she felt as though she were sitting on her bowels. He had never known deep prolapse of the vaginal vault to follow a supravaginal operation. When exploring his own cases several years after the removal of the uterus, he found as a rule that the vaginal portion of the stump had become very small and had risen in the pelvic cavity. It served as a support to the floor of the pelvis.

Klein, at the conclusion of the discussion, stated that he was preparing statistics of the effects of the supravaginal operation on menstruation. Out of from 40 to 50 cases in his practice the period returned once or oftener; it appeared at intervals of three or four months in a case where only a small piece of uterus and ovary were left. He always saved as much as possible of the uterus. In no case did he detect degeneration of the cervical stump, and he considered that cancerous changes in that structure were extremely rare. Statistics throwing some light on the influence of more or less conservative hysterectomy on the catamenia have already been published by Crewdson Thomas (*Lancet*, Vol. i., 1902, p. 294) and the present writer "Harveian Lecture ii.," *ib.* Feb. 14, 1903). Klein's report will no doubt prove most valuable to all who take an interest in hysterectomy.

ALBAN DORAN.

The Pathological Anatomy of Chronic Metritis.

LORENTZ. *Archiv für Gynäkol.*, 1903. Bd. 70, Ht. 2.

THE writer has investigated nine uteri extirpated on account of persistent hæmorrhage by Drs. Theilhaber and Klein. The clinical

features of these cases were those usually associated with the name "chronic metritis." These are recorded in considerable detail. There was always considerable enlargement of the uterus with thickening of its walls. The cavity was generally increased in size. The tissues were soft and flabby, with numerous vessels. The mucosa was not thickened, and the serous covering was normal. Microscopic examination revealed marked increase of connective tissue with relative loss of muscle. The hypertrophy of connective tissue was not uniformly distributed but was specially obvious in certain places. The mucosa showed no alterations of importance. Chronic metritis has been regarded as secondary to endometritis, but is now seen to be a primary fibrosis of the myometrium in most cases. The changes in the vessels are not atheromatous, but are of the nature of obliterative arteritis.

W. E. FOTHERGILL.

So-called Chronic Metritis; Its Causes and Symptoms.

THEILHABER. *Archiv für Gynäkol.*, 1903. Bd. 70, Ht. 2.

BLEEDING from the uterus, which weakens the patient by its duration or its rapidty, is usually due to one or other of the following causes:—

1. Changes in the mucosa (polypi and retained placental structures are here included).

2. Changes in the mesometrium (myometrium). (*a*) Insufficient development of the musculature in the years immediately following puberty; (*b*) Atrophy of the musculature in after life or after exhausting diseases, etc.; (*c*) Increase of connective tissue with retrograde changes in the musculature following frequent pregnancy, chronic disease of the appendages, etc.; (*d*) Interstitial œdema of the musculature in acute and sub-acute disease of the appendages.

3. Hyperæmia of the uterus. (*a*) Through over-development of its vessels; (*b*) through vaso-motor dilatation of the vessels.

4. Presence of foreign bodies, tumours, placental masses, etc., which prevent complete contraction.

5. Ulcerations (cancerous, tuberculous, etc.).

Most cases fall under the second and third headings, according to Teilhaber, who next summarises the history of "chronic metritis" showing that it has been regarded as an inflammatory condition secondary to endometritis. He mentions that he and his assistants, Meier, Hollinger, and Lorentz, have examined more than 100 uteri, with the result that changes in the mucosa are proved to be rare in cases of menorrhagia and metrorrhagia. Former writers laboured under the disadvantage that in their time uteri were not removed except for cancer. But in these days of hysterectomy for persistent

bleeding and other indications, the condition known as chronic metritis can be shown to be a primary hypertrophy of the uterine connective tissue. This, in the writer's experience, is an extremely common condition. There is a decrease of uterine muscle with increase of fibrous tissue, increase in size of the organ, in the size of its cavity, and in its vascularity.

Increase of fibrous tissue is a physiological process just before and after the menopause, and, when normal, the change is not accompanied by increased size of the organ, but by atrophy, anæmia replacing the hyperæmia of disease. But whenever the musculature is not able to control the blood supply, whether at the climacterium or at other times, there is venous stasis, hypertrophy of connective tissue, and hæmorrhage, with ultimate increase in the size of the organ.

The writer holds that chronic metritis very rarely follows acute metritis, gonorrhœal or puerperal. Neither does he believe that flexions and versions can produce the condition under discussion. Prolapse of the uterus, cancer and fibromyoma are also disregarded.

The approaching climacterium is the commonest cause of chronic metritis. In women, during the pre-climacteric period, the presence of an enlarged, thickened, generally soft, but also sometimes hard uterus with an enlarged cavity is extremely frequent. The primary change is atrophy of the musculature—the one unvarying factor in approaching senility of the sex organs. Physiologically this muscular atrophy is accompanied by stenosis of the vessels and a lessening of the blood stream in the organ. If from any cause this vascular change is delayed until the fibres have atrophied, muscular insufficiency permits of venous stasis and engorgement. This in turn leads to hypertrophy of the connective tissue, which completes the picture of chronic metritis so-called. Pre-climacteric menorrhagia and metrorrhagia are the leading symptoms of this state. Later, as stenosis of the blood-vessels occurs, the bleeding stops, but the uterus remains enlarged. If these patients are watched for years it is found that gradually, after the cessation of hæmorrhage, the whole organ again becomes reduced in size, and after its senile atrophy has advanced considerably, often falls into a position of retroflexion. This was Scanzoni's "second stage" of chronic metritis, which is for the most part without symptoms.

In tubal and ovarian disease of long standing a similar hypertrophy of uterine connective tissue often occurs, followed, in this case also, by atrophy after stenosis of the blood-vessels has proceeded to some extent.

Frequent parturitions produce a similar condition, for normally there is more connective and less muscle in the uterus after every confinement than before it. In fact, the size of the uterus varies

directly with the number of pregnancies completed. Over exertion of the uterus in deliveries through contracted pelves must be recognised as a special cause of muscular atrophy during early reproductive life. Muscular degeneration also follows chlorosis and thus explains the menorrhagia of some anæmic girls. The condition also follows lung disease, typhus, rheumatism, and other exhausting processes. General disturbance of the circulation through heart disease used to be described as a cause of chronic metritis. In the writer's experience this is not an important factor. Compensation is usually good until the pre-climacteric period is reached. Then if compensation becomes disturbed backward pressure doubtless favours uterine hyperplasia.

The main symptoms of chronic metritis so-called are hæmorrhage and leucorrhœa. Both may subside for months (a distinction from malignant disease), but even in young patients bleeding may be persistent for many weeks. In pre-climacteric cases leucorrhœa may be slight or absent, in younger women it may be excessive. Pain is not an important feature of these cases unless they are due to primary disease of the appendages. Tenderness or pressure is also absent in pure chronic metritis, as are the so-called reflex symptoms, headache, neuralgia, eye symptoms and breast pain. Dysmenorrhœa and sterility are also absent, conception being common when the tubes and ovaries are sound. The size of the uterus varies with the stage of the condition, increase usually being noted at the time when symptoms cause the patient to come under examination. As to the cervix, its lesions as a rule have nothing to do with the condition under discussion. It is clear that the old treatment of chronic metritis by local measures attacking the endometrium is quite worthless. The condition must be dealt with on general lines.

W. E. Fothergill.

Diabetes Mellitus and Metritis Dissicans.

Liepmann. *Archiv für Gynäkol.*, 1903. Bd. 70, Ht. 2.

This is a paper based upon three cases of metritis dissicans or partial gangrene of the uterus under the influence of puerperal sepsis. One case was complicated by diabetes mellitus.

A woman, aged 30, six-para, had suffered previously from pneumonia and from diabetes. Near the end of the pregnancy she presented the clinical features of hydramnios. The urine contained much sugar, traces of albumen and leucocytes, but no casts or renal epithelium. Over 11 litres of liquor amnii were drawn off, and, later, the fœtus was turned. The pulse became bad and delivery was completed, with the escape of an enormous quantity of dark

blood. The uterus would not contract and was plugged. The next urine contained no sugar. Next day the plug was removed and the uterus washed with four litres of 50 per cent. alcohol (*sic*). The presence of streptococci in the uterus was demonstrated. The copious urine contained 0·6 per cent. of sugar. The following day 9800cc. of urine was passed containing 4 per cent. sugar. On the fourth day the patient was maniacal. On the sixth day there was much acetone in the urine, and on the eighth day she died. The liquor amnii was found to contain a considerable quantity of sugar. The appearance of sugar in the liquor amnii has been noted previously by Partridge and by Graefe. It is held to prove that the source of the liquor amnii is mainly the maternal tissues. Ludwig found 0·3 per cent. of sugar in four litres of liquor amnii. Rossa found 0·345 per cent. in another case. In Ludwig's the fœtus was already macerated; in Rossa's the fœtal urine was found to be free from sugar.

Liepmann's patient passed no sugar the day before or the day after labour, but on the third day she passed 10 litres of urine containing 4 per cent. of sugar; *i.e.*, 0·400 grammes of sugar in a day. It is well-known that persons free from sugar at the time of operation often die in diabetic coma shortly after operation. A number of cases illustrating this fact are cited by the writer, who next proceeds to explain the special liability to septic infection of diabetic persons. Grossmann showed by a series of experiments that the growth of pus-producing organisms is much more rapid in media containing glucose than in other substances; also that animals rendered glycosuric by artificial means are much more liable to septic infection than are normal animals of the same species. Mehring and Minkowsky have also shown experimentally that the resistance of the tissues to septic organisms is very low in diabetic animals.

The writer next describes the macroscopic and microscopic appearances of the uterus of his patient, which was lined by a slough involving a large portion of the myometrium.

The second case was one of criminal abortion near the third month, in which a portion of the uterus necrosed and was removed from the vagina nine days before the death of the patient. There were two uterine perforations due to the separation of the slough; one of these communicated with the intestine.

The third case was one of prolonged labour ended by craniotomy, the liquor amnii being already septic at the time of operation. Later supravaginal extirpation of the septic uterus was performed without success. In this case also a thick slough lined the uterus.

The writer points out that these three cases show that metritis dissicans presents no typical clinical picture and may run a varied

course. The temperature falls with separation and expulsion of the slough, but death may occur from general pyæmia before sufficient time has elapsed for the completion of the necrosis and separation of the dead tissue.

W. E. FOTHERGILL.

Vaginal or Abdominal Operation in Gynæcological Disease.

ABEL (KARL). *Berl. klin. Wochenschr.*, December 7, 1903, No. 49 (and report of discussion in same number, p. 1,135).

THIS paper of Abel's contains in brief the substance of his monograph on "Vaginale und abdominale Operationen," which was reviewed in the November number of this JOURNAL. For a fuller statement of his position reference may be made to that review, as the object of this abstract is rather to give an outline of the discussion which followed than of the paper itself. His main contention is that vaginal cœliotomy ought to be the principal operation for pelvic disease in women, as its risks are less, recovery is more rapid and there are fewer troublesome after-effects, and that, in consequence, the number of abdominal sections ought to shrink to a minimum. His attitude with regard to myomata is interesting. After sketching the constitutional symptoms to which they give rise—and among these he especially emphasises the myocardial changes—as well as the degenerative and malignant changes which may occur in the tumour itself, he maintains that to await such symptoms before operating is to miss the most opportune time. If, while the tumour is still small, and the patient in good condition, vaginal section is done, a conservative operation may be possible and the uterus retained; in any case the risk is then so slight that, like ovarian cysts, these growths ought to be operated on as soon as they are diagnosed. Extensive morcellement may be necessary to allow of the operation being performed per vaginam, but this, though more tedious and less "showy" than the abdominal method, is safer for the patient and therefore better. With regard to ovarian growths, the only exceptions he recognises to their removal per vaginam are malignant tumours and solid tumours larger than a child's fist.

The discussion which followed the reading of this paper at the Berlin Medical Society was a keen and animated one. The statistics were called in question on the ground that the laparotomies included a very large series from many operators, and not all of recent date, while the colpotomies formed a much smaller list; also that the difficult and serious cases were done through the abdomen and the simple ones by the vagina. The indications for operating on myomata and for retroflexion of the uterus were criticised, and

several speakers instanced the newer methods of abdominal incision, such as Küstner's and Pfannenstiel's, as greatly obviating the cosmetic objections to, and risk of hernia in, the scar. There was a very general agreement that in view of the diminished shock and the rapid convalescence, the vaginal operation ought to be adopted as far as possible, but that even when technically possible it was not therefore necessarily good. Various suggestions were put forward to help in the selection of cases, and these formed perhaps the most interesting, and certainly the most instructive, points in the discussion.

Bröse, speaking as one who had performed a large number of vaginal sections, and as a zealous advocate of such operations under suitable conditions, took special exception to Abel's assertion that the old classical ovariotomy was to sink into so insignificant a position. In 41 vaginal ovariotomies he had been compelled on three occasions to complete the operation through the abdomen, as the cysts had developed retroperitoneally. In the others he had to do with small unilocular tumours, at most not larger than a child's head. Large multilocular tumours can be removed without very great difficulty through the vagina, but they must be broken up, and that he considered bad. Abel agreed that malignant tumours ought not to be removed by colpotomy, but how was he to be sure of the diagnosis of malignancy? Epithelial fragments of apparently benign tumours have been known to give rise to secondary growths. Then as to adhesions, how could adhesions to the under surface of the liver, for instance, be separated from the vagina? And as for subserous development, what could have been done in one of his cases, where one pole of the tumour had grown up as far as the kidney, so that the ureter was closely attached to it and had to be carefully stripped off? As regards myomata, no doubt whenever the vaginal operation is possible it ought to be adopted, but there is a point beyond which even the most practised must leave the vaginal route and take to the abdominal. It had happened to him in his thirty-first case that he must needs complete the operation by the abdomen.

Theodore Landau added another contra-indication to the vaginal route, that is, the slightest possibility of disease of another system, appendicitis, for example. He considered as suitable for colpotomy: (1) Plastic and orthopædic operations on uteri or adnexa, in the absence of considerable enlargement and extensive fixation. (2) Myomata; the size possible for vaginal removal largely depended on the experience of the operator. (3) Unilocular ovarian cysts; for these, size is of no importance, and for thin-walled movable cysts of this type the vaginal route is reserved. No hard or firm cysts ought to be attempted unless they can be pushed through the pelvis. Ascites is an absolute contra-indication, as is also a bifid or

malformed uterus, as it cannot be brought outside the vulva. (4) Extra-uterine pregnancies, except when there is inflammatory mischief also, or when the sac or hæmatocele reaches to the navel, or where there are encysted collections of blood above the pelvis. (5) Chronic disease of the appendages, when the inflammatory mass is not too large; the short inelastic infundibulo-pelvic ligament is apt to tear and may be very difficult to secure, and with the bleeding from separated adhesions has involved removal of the whole uterus.

Koblanck called attention to the fact that 15 per cent. of ovarian tumours are malignant. The important consideration with regard to myomata was that the tumour should be in part pelvic, so that some portion of it was easly within reach.

Dührssen supported Abel, and thought that 75 per cent. of the ventral operations now done might be performed instead by the vagina. Bröse's objection that the operation might have to be completed by the abdomen is not a serious one; he (the speaker) has had no fatal case where this has been done. With regard to myomata, it is a great advantage to be able to drain into the vagina in cases of enucleation, as the general peritoneal cavity could be entirely cut off.

Abel, in reply, considered Bröse's contention as to the difficulty of knowing when a tumour of ovary was malignant to be of little importance, for as soon as the peritoneal cavity was opened a diagnosis could usually be made quickly by the finger, and the abdomen opened forthwith, if necessary. When concomitant disease of the digestive tract was discovered he again at once performed abdominal section. He denied that the risks of hæmorrhage in operating on a fixed retroflexion were as great as some seem to think. On the question of the indications for operation in myomata, patients only came for advice when they had symptoms. By malignant degeneration of fibroids he included cases of carcinoma complicating fibroids, and mentioned two cases where he ascribed the hæmorrhage to the tumour, but found a growth in the body after the removal of the uterus.

J. S. Fairbairn.

REPORTS OF SOCIETIES.

OBSTETRICAL SOCIETY OF LONDON.

Meeting, Wednesday, December 2nd, 1903, EDWARD MALINS, *M.D., President, in the Chair.*

Mr. MALCOLM and Dr. HAMILTON BELL contributed a paper on

A Case of Hydatidiform Mole with Bilateral Cystic Disease of the Ovaries and Invasion of the Muscular Wall of the Uterus by Chorio-Epithelioma, the patient being quite well two years after removal of the parts.*

Dr. PETER HORROCKS congratulated Mr. Malcolm and all those concerned in the happy issue of their case, for there could be no doubt that this woman had been rescued from a very dangerous condition. There was one practical point which stood out prominently during the reading of the paper, and that was the great superiority of the finger over the curette in the removal of a hydatid mole. With the finger one could gently scrape away the hydatids from the places where they were attached instead of blindly scraping everywhere, as with a curette; secondly, one knew just how much pressure to use to set them loose, also one could carefully avoid going too deeply at those points where the villi penetrated further than healthy chorionic villi, as they were apt to do; and, lastly, it might have been possible, had the forefinger only been used, to have discovered the malignant disease in the wall of the uterus.

Dr. HERBERT SPENCER hoped the authors would alter the title of the paper so as to include the essential feature of the case, namely, the occurrence of chorionepithelioma after hydatidiform mole in a patient with cystic disease of the ovaries. He agreed with Dr. Horrocks that curetting was a dangerous method of removing a mole, and it appeared possible, from an examination of one of the specimens, that the growth had been insulated by the curette. He did not approve of Mr. Malcolm's intention to remove the uterus by the supra-vaginal amputation. Whatever views might be held as to the relative advantages of amputation and total hysterectomy in the case of fibroids, he thought that in suspected malignant disease, and especially in chorionepithelioma (in which growths were known to occur in the cervix), total hysterectomy should be performed.

Mr. G. J. B. STEVENS, as a visitor, begged to thank the authors for their papers; especially he wished to do so as there was a practical piece of information of much importance to men in general practice and which could be obtained only by attendance at some such Society as this, as it formed no part of book-reading. In the course of 37 years of practice the few cases he had had to deal with were cleared out by the finger and ovum

* *Vide* Vol. iv., p. 521.

forceps. They happened before the curette was much talked about. Having once got rid of the uterine contents after-consequences or associated troubles scarcely entered his head. Now, however, he should be careful to apply to the next case the knowledge imparted and should look carefully for associated changes in the ovaries and uterus.

Mrs. Scharlieb gave a short account of a case of vesicular mole, complicated with double multilocular ovarian cysts.

Dr. Bell, in reply, said that this case, which was the first to come under his care after his appointment to the Samaritan Hospital, was one which had always seemed to him of very great clinical and pathological interest. The difficulties of diagnosis and treatment were very considerable. He wished particularly to refer to the question of curetting, the propriety of which had been questioned by both Dr. Horrocks and Dr. Spencer. He quite admitted that the use of the curette was not usually advisable in cases of hydatidiform mole, and in the only two cases which had come under his own care he had been able to evacuate the uterus with the ovum forceps and the finger. This case, however, was exceptional. After removing the bulk of the tumour with the ovum forceps he put in a finger to scrape away the rest. But it proved very tough, the hæmorrhage was considerable, and the condition of the woman, bad before the operation began, was now very serious. It was under these circumstances that it was determined to use the flushing curette, which checked the hæmorrhage, and was more expeditious. He (the speaker) recognised that there was some risk, but it appeared to him that it was a choice of risk, and that under the special circumstances of the case he had made the right decision. Perhaps these special circumstances had not been made sufficiently plain in the paper, and it had appeared as if he advocated the use of the curette in all cases. This was not the case, and after the remarks of Dr. Horrocks and Dr. Spencer he would probably hesitate still more in the future than he had done on this occasion.

Mr. Malcolm supported Dr. Bell's view that in this particular case it was impossible to remove all the hydatidiform material with the finger. Indeed, it was thought that at the first operation all the disease was not removed by the curette. He also thought that it was not likely that the new growths could have been felt by digital examination, because they were so small and so deeply placed in the uterine muscle. The suggestion that a wound made by the curette might have allowed the disease to gain access to the tissues might be correct, but it did not seem necessary to assume the existence of a wound if a new growth were adherent to the interior of the uterus. As regarded the removal of the body of the uterus first and the cervix afterwards, it would have better to remove both at once, but the removal of the body was undertaken rather as a precaution than on account of any definite disease diagnosed, and the cervix had always appeared healthy. When the suspicious parts were observed it seemed desirable to remove the cervix also, and this was done.

Dr. T. G. Stevens gave a lantern demonstration on the

Fate of the Ovum and Graafian Follicle in Præ-menstrual Ages.*

Dr. Eden wished to express the admiration he felt for the fine piece of work which Dr. Stevens had laid before the Society that evening. The labour involved in the examination of 70 pairs of ovaries by serial section

* *Vide* p. 1.

was enormous, and the author deserved the greatest credit for the time and patience which he had bestowed upon the work. The field covered by the research was entirely new, so far as his knowledge went, and Dr. Stevens could quite fairly claim the credit of being a pioneer. The most interesting part of the demonstration consisted in the method by which the ovum was disposed of in the contracting follicles. If Dr. Stevens' view were correct the normal protective and nutritive functions of the cells of the membrana granulosa became suddenly suspended when the follicle had reached a certain stage of development, and destructive functions were exercised by the same cells instead. This reversal of the direction of physiological activity was, to say the least, very remarkable, and it had no analogue in any other part of the body. But he felt bound to say that he was not absolutely convinced that the destructive cells were really cells of the membrana granulosa. He thought it possible, notwithstanding Dr. Stevens' arguments, that they might be leucocytes. The weak point in the author's case consisted in the fact that his material was all post-mortem material. No importance could therefore be rightly attached to the absence of signs of diapedesis; this was a vital process, and could not be studied in dead tissues. Further, he thought it possible that the staining reactions of the destructive cells might be entirely different if they could be obtained in the living state. Perhaps Dr. Stevens could arrange to carry out a few control observations upon operation specimens or even upon the ovaries of young mammals—monkeys by preference.

Dr. Peter Horrocks thought the paper was conceived in a scientific spirit and that the address had been delivered in an admirable manner. He asked if the slides as shown on the screen represented not merely different degrees of developmnt of the ovum, but also different ages of the children, from whom the ovaries had been taken? Thus, was the fullest developed ovum from the oldest child and the most immature from the youngest? At present it seemed a very strange thing, if Dr. Stevens' observations were correct, that the ovaries should develop ova up to a certain degree of maturity and then develop cells to devour them. He thought it would be of great scientific value and that it might throw fresh light upon the whole question if Dr. Stevens would continue his researches into the condition of the ova developing in ovaries of girls right up to the full establishment of puberty.

Dr. C. Hubert Roberts added his testimony to that of other speakers as to the excellence of the paper, and especially the microscopical drawings, which Dr. Roberts from personal experience knew were very difficult to do. Dr. Roberts asked for further information with regard to the origin of the liquor folliculi; he did not think Dr. Stevens had made it at all clear as to what was the exact process of degeneration which the cells of the membrana granulosa underwent or if it was a degeneration at all. As to the entrance of certain cells into the zona pellucida of the ovum itself, Dr. Roberts was inclined to think the cells depicted were rather of the nature of leucocytes than those of the membrana granulosa, and that the process resembled phagocytosis to a considerable degree. As to the last section shown (the cystic ovaries of a child), Dr. Roberts regarded these cysts as rather pathological than physiological. Dr. Roberts was well acquainted with such ovaries, and it was not very uncommon to find bilateral cystic disease of the ovaries in young children. Cystic disease is certainly a morbid condition, and there were several such specimens in the Royal College of Surgeons' Museum, one of which Dr. Roberts had drawn in his book on gynæcological pathology.

Dr. BLACKER thought that there were several difficulties in the way of accepting Dr. Stevens' views as to the part played by the cells of the membrana granulosa in the destruction of the ovum, and the phagocytic action he wished to assign to them. Nagel in his work on the ovum had held that the zona radiata was really a part of the innermost layer of the cells of the membrana granulosa. If this was so then the theory that the cells of the membrana granulosa burst through the zona radiata and then invaded the ovum could hardly be correct. Further than this these cells were degenerating, and such cells did not, as a rule, take on such important functions as phagocytosis. He thought that the cells found lying within the ovum were probably more of the nature of cell inclusions.

Dr. VICTOR BONNEY remarked that he was particularly interested in the light thrown by Dr. Stevens' researches on the fate of the tunica granulosa. He thought that Dr. Stevens' specimens showed very clearly that in præ-menstrual life the granulosa cells retrograded *pari passu* with the ovum, whilst in adult sexual life they continued to grow after dehiscence of the follicle and formed the lutein layer of the corpus luteum. He had examined Dr. Stevens' specimens attentively and could find in them nothing at all resembling a lutein layer. Seeing that much recent work by various observers tended towards a conception which allotted to the lutein layer the function of producing the internal secretion of the ovary, and seeing, further, that the most striking point of difference between the child's and adult's generative organs lay in the fact of the latter's possessing a corpus luteum and the former not possessing it, he thought that Dr. Stevens' work suggested strongly that it was to the persistence and continued growth of the granulosa cells after the disappearance of the ovum from the follicle by dehiscence, that we owed that development of sexual characteristics which marked puberty.

Dr. STEVENS replied.

Dr. VICTOR BONNEY showed a specimen of a *Myoma undergoing Red Degeneration*. He had removed it together with the uterus from a patient, aged 42. The tumour had existed for some years without any symptoms, but during the last six months had increased in size and become very painful. Microscopic sections of the tumour showed diffuse necrobiotic change with disappearance of nuclei and degeneration of the muscle fibres. Dr. Bonney pointed out that in the peculiarly rapid onset of symptoms after a long period of latency in the presence of well-marked fever, and in its macroscopical and microscopical structure it was an excellent example of this form of degeneration, to which the observations of Fairbairn and others had lately directed attention.

Dr. RUSSELL ANDREWS exhibited a specimen of *Bilateral Extra-uterine Pregnancy*. (1) Lithopædion, full term, which had been eight years in abdomen; (2) fresh three months fœtus.

BRITISH GYNÆCOLOGICAL SOCIETY.

Meeting, December 10th, 1903, DR. HEYWOOD SMITH, *President, in the Chair.*

Dr. H. MACNAUGHTON-JONES showed a *Modification of Bossi's Instrument for dilating the Cervix*, much less cumbersome and much easier to work than the original model, which in 1901 he had been the first to use in this

country; since that time many cases of labour had been successfully and expeditiously concluded by the aid of that instrument, and he believed that the lacerations which had in some cases followed its use on the Continent and in America were to be attributed to want of caution in its application or to too rapid dilatation.

Dr. H. MACNAUGHTON-JONES, jun., said he had used the instrument shown to induce labour at the eighth month in a tertipara with a large fibroid, and found it most satisfactory.

Dr. MACNAUGHTON-JONES showed the following specimens with the aid of the epidiascope:—(1) *Sections of Duct Cancer in an Axillary Gland;* (2) *Sections of Sclerosed and Cystic Ovaries;* also (3) *Blood Cyst containing Chorionic Villi;* the entire cyst wall, though everywhere adherent to the layers of the broad ligament between which it lay had been removed, but the operation had been a difficult one; there was a large hæmato-salpinx in the oviduct; (4) *An Ovarian Pus Sac with a large Hypertrophied Oviduct,* the other ovary being cystic with corresponding changes in the tube; rapid recoveries followed the removal of this and the previous specimens; (5) *Uterine Myoma with Central Calcareous Degeneration.*

Dr. BEDFORD FENWICK showed a *Fibroid Tumour removed for Profuse Hæmorrhage,* an example of necrosed polypoid extrusion into the cavity of the uterus and of degeneration in the ovary consequent upon the adhesions and interference with the blood supply associated with such tumours.

Dr. BEDFORD FENWICK read a paper upon

The Treatment of Stenosis of the Cervix.

especially in regard to that congenital form found with a conical portio and a pinhole os, and generally associated with dysmenorrhœa and sterility. After division of the cervix on each side for about half its length with scissors, his method was to draw the flap formed by the anterior lip together, longitudinally, with temporary sutures and leave the posterior lip flat and open; direct union of the surfaces of the wounds was thus prevented, they became covered with mucous membrane, so that they did not afterwards adhere, and the patency of the canal was maintained. In 87 cases in which he had practised this operation it had invariably given relief, and, from subsequent investigation, he had reason to believe that in 91 per cent. of these cases the relief had been complete and permanent. Moreover the method had been equally successful in the hands of others who had adopted it after seeing him apply it at the Hospital for Women, Soho.

In the discussion Dr. C. H. F. ROUTH and Dr. G. R. HODGSON concurred in recommending the use of a stem pessary instead of operation, and Dr. MACNAUGHTON-JONES and the PRESIDENT in preferring division of the isthmus with Sim's knife, followed by dilation.

Dr. FENWICK briefly replied.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting at Sheffield, November 30th, 1903, DR. J. E. GEMMELL, *President, in the Chair.*

SPECIMENS.

Dr. JOHN W. MARTIN (Sheffield) showed some rounded bodies removed from a single woman, aged 41, in whom an exploratory incision revealed a large fibroid tumour. Its surface and that of the peritoneum generally were studded with these bodies, which varied in size from a pea to a small tangerine orange. Some of them were removed, and the abdomen was closed. There was no ascites.

Professor ARTHUR HALL (Sheffield), who examined the tumours, said that they possessed distinct capsules out of which the contents could be shelled. Within the capsule were others, and in the interspaces lay large oval pigmented bodies like the cells of melanotic sarcoma. Regarding the nature of these the appearance suggested hydatid, but they were manifestly actively growing and showed no evidence of hydatid. They might be ova or deposits of pigment, but he had an open mind as to the precise nature of the growth.

The PRESIDENT asked if hooklets had been found.

Dr. R. FAVELL (Sheffield) said he had been present at the operation. The main growth was an ordinary fibroid tumour, and in his opinion was unconnected with the smaller growths which he thought sprang from the peritoneum.

Dr. LLOYD ROBERTS (Manchester) inquired if emaciation was present.

Dr. MARTIN, in reply, said no hooklets had been found, nor was emaciation present. The fibroid was about the size of a man's head.

Dr. W. WALTER (Manchester) showed:—

1. Ovarian cyst with pedicle twisted two and a half times, without change in cyst wall or contents.

2. Fibroma of uterus removed by supra-vaginal hysterectomy. It was interstitial in position, and its connections did not allow of enucleation.

3. Multiple fibromata of uterus involving lower uterine segment as well as fundus. Supra-vaginal hysterectomy was rendered difficult by the existence of pelvic impaction.

CASES.

Dr. T. B. GRIMSDALE (Liverpool) read notes of a case of

Sloughing Submucous Fibroid of the Uterus Projecting through the Cervix, Treated by Abdominal Hysterectomy,

and showed the specimens.

The PRESIDENT remarked that on the question of the route employed the choice must lie with the operator. He thought he would have adopted the vaginal route in this case.

Dr. W. WALTER said the keynote was the size of the vagina. When the latter was small he considered that the risk was less if laparotomy was carried out. He asked whether, in Dr. Grimsdale's case, it would not have been better to remove the sloughing part of the tumour *per vaginam* in the first instance, and then proceed *per abdomen*. Regarding infection of

the laparotomy wound he said it was astonishing how rarely it followed operations for pyosalpinx when the wound was carefully protected by packing.

Dr. LLOYD ROBERTS thought Dr. Grimsdale had adopted the best route possible in his case. Had the vagina allowed of rapid removal then that route would have been preferable. He emphasised the necessity for preserving the uterus if possible, and suggested that the uterus might have been opened, the tumour enucleated and the uterus sewn up and saved for the performance of its natural function.

Dr. E. O. CROFT (Leeds) said that Dr. Grimsdale had obviously adopted the only course possible. Was there any infection of the vagina that might account for the post-operative foul discharge?

Dr. GRIMSDALE, in reply, said he should feel inclined to attack any fibroid *per abdomen* unless vaginal access was extremely easy. He laid stress on rapidity of operating; when sepsis already existed, delay favoured infection. It would have been quite possible to remove the sloughing part *per vaginam* in the first instance, but no advantage could have accrued as the whole of the uterine cavity was septic. No slough was seen in the vagina. As no peritoneal infection occurred, he thought it possible that skin might be more liable to infection.

Dr. R. FAVELL (Sheffield) read notes of the following:—

1. Vesicular mole passed, the day after admission to hospital, by a married para, aged 31. Two small purplish growths of the size of raspberries were excised from the anterior vaginal wall. Exploration of the uterus showed that the mole was of the destructive variety. The patient made a good recovery.

Three cases of uterine tumours:—

1. Submucous fibroid removed from a woman aged 33; married; no children. Watery discharge and hæmorrhage.

2. Degenerating submucous fibroid. Patient aged 50; two children, youngest being 25. Menopause at 47. Watery discharge for three years; abdominal pain for a few months.

3. A case of tumour, probably sarcomatous in nature, removed on the same day. Patient aged 37; married 11 months. For the last few months had thought herself pregnant as the abdomen had been getting larger, and pressure symptoms were present. Menstruation regular, profuse.

In the ensuing discussion the PRESIDENT and Dr. LLOYD ROBERTS suggested that the first case seemed to be a favourable one for performing "Cæsarean section" of the fibroid, the latter holding that this was perfectly justifiable in a woman in the child-bearing age. In a woman of 50 it did not appear necessary.

Dr. W. WALTER said that when it was possible he always removed fibroids by enucleation or by a sort of "Cæsarean section." Although his experience in nearly every case was that the uterus was so bruised by this that it became a question whether it was worth while preserving, yet the operation should always be begun with the hope of saving it.

Dr. CROFT having spoken,

In reply, Dr. FAVELL held that the attachment of the tumour in the first case was so broad as to preclude any attempt at "Cæsarean section."

The PRESIDENT (Dr. J. E. Gemmell, Liverpool) read notes of a case of

Complete Occlusion of the Os Uteri Externum at Full Term.

The patient was a primipara who, when seen, had been twelve hours in labour. There had been some hæmorrhage which proceeded from a vaginal laceration on the left, there was no trace of an os, but a cystic swelling bulged into the roof of the vagina, and in this the fœtal head was felt. The patient was admitted into the lying-in hospital in a collapsed condition. On examination, a white spot the size of a pin's head was found on the left of the swelling, and a crucial incision was made through it. The child was delivered with forceps, incision of the perinæum being necessary. Subsequently the temperature went up, and, local examination proving negative, antistreptococcus serum was given. After slow convalescence the patient left hospital. It was pointed out that such an occlusion was not always the trivial matter it is generally regarded as being. Mattei, in a collection of cases, showed 36 operations out of 42 cases, with three maternal deaths.

Dr. LLOYD ROBERTS mentioned two cases which had occurred in his experience, and the PRESIDENT replied.

Dr. E. OCTAVIUS CROFT (Leeds) read a paper on

Three Cases of Urinary Calculus in the Female.

In the first case a stone weighing five grains was passed spontaneously *per urethram*. The second calculus weighed 232 grains and was removed by vaginal cystotomy from a woman aged 62. The same treatment resulted in the third case in the removal of a stone 510 grains in weight from a woman aged 20. Dr. Croft thought that in all three cases the calculi had their origin in the kidney, and he emphasised the necessity for removing stones of such size by a vaginal incision in preference to dragging them through the urethra or performing a tedious lithotrity.

Dr. GRIMSDALE thought it was better not to suture the vaginal incision; he preferred to place a tube in it and drain for a week before allowing spontaneous closure to take place. In a small vagina this saved trouble.

Dr. W. WALTER agreed with Dr. Croft's remarks anent the route adopted, and considered that even exploration of the bladder per urethram by means of the finger was unsafe.

The PRESIDENT and Dr. LLOYD ROBERTS having spoken, Dr. CROFT replied.

GLASGOW OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

Meeting, November 25th, 1903, DR. J. NIGEL STARK, *President, in the Chair.*

Dr. KERR showed (1) *A Uterus* removed from a patient on whom he had twice performed Cæsarean section successfully. On the first occasion, in January, 1902, he had employed the fundal incision of Fritsch. During the second pregnancy there was no disturbance, but as the patient insisted on being sterilized on the second occasion he performed hysterectomy after extracting the child. The uterus was found extensively adherent to the anterior abdominal wall, but there were no unusual adhesions of the bowel

to the fundus. The stump was treated intra-peritoneally. The patient was doing well, and both children were alive and healthy. (2) *Two Ovarian Cysts* removed a week ago from a patient sent to him by Dr. Gardiner, of Coatbridge. The patient suffered from extremely severe attacks of abdominal pain. The cysts contained a large quantity of disorganised blood, and the one was the size of an orange, and the other of a hen's egg. The operation was of some difficulty, for the cysts were closely adherent to the surrounding structures.

A discussion upon

Accouchement Forcé,

with special reference to the instrument of Bossi, was opened by Drs. JARDINE and MUNRO KERR.

Dr. ROBERT JARDINE, in his opening remarks, referred to the definition of *accouchement forcé*, given by Williams. He remarked that the operation was almost entirely done in the interests of the mother, but in a few rare cases it might be done in the interests of the child, as when the cord prolapsed very early in the course of labour, when the membranes ruptured before labour began and the pressure was detrimental to the child. The operation was most frequently done for eclampsia. In pernicious vomiting, heart disease, chorea and insanity it might be necessary. In cases of complete occlusion of the os the speaker had performed it upon five or six occasions. The methods of performing the operation were then discussed. The extraction of the child was not touched upon, but only the dilatation of the cervix. It was noted that when the cervix was not taken up, but retained its full length, it was more difficult to dilate than when it was so taken up, as found in those who had reached term, and especially in those where labour had begun. The dilatation might be carried out forcibly or by the aid of incisions. Digital dilatation was mentioned as being the oldest method. If the cervix was soft and yielding, full dilatation would be obtained in fifteen or twenty minutes. The strictest aseptic precautions had to be observed. A continuous hot douche during the process was beneficial. Chloroform should be administered, not only to prevent pain, but to assist the relaxation of the cervix. Though the lithotomy position was the more suitable, the lateral was also convenient. After dilatation delivery was completed in a variety of ways, according to the nature of the case. Dilatation by means of instruments:—In some cases, if the cervix was very soft, hydrostatic bags might be used. This was a slower method, and where time was of great importance the method was not very suitable. Hegar's dilators were useful to begin the operation with when a finger could not be inserted. Expanding dilators were the most useful, and of these Bossi's or a modification was the best. (The various varieties of the instrument were shown.) The eight-pronged instrument of Frommer was recommended. The dilatation must be continuous and slow. From twenty to thirty minutes were required for the full dilatation of the cervix. If carefully used there was very little tearing of the cervix. Dr. Jardine then related the histories of several cases in illustration. The incision method was next reviewed. The speaker had done this operation quite a number of times in eclampsia cases. He had practised the making of four incisions in the cervix. Further dilatation was obtained by the hand. In some cases the cervix had been subsequently stitched, while in others, where there was no hæmorrhage, the cervix was left alone; the after-results had been quite as good in the latter. Dr. Jardine

had not practised vaginal Cæsarean section. From his experience of the incision method he was convinced that less shock followed than from forcible dilatation. In conclusion, Dr. Jardine stated that he thought Bossi's dilator a most useful instrument, but in a case where the cervix was extremely rigid he would prefer the incision method.

Dr. J. M. Munro Kerr, in introducing the discussion, limited himself to considering the methods of forcibly enlarging the cervical canal, and did not refer to the subsequent extraction of the child. He described briefly the methods of manual dilatation, and gave examples from his own experience. He considered that by this method, to safely dilate and extract a child when the cervix was not taken up, required on an average forty minutes in a multipara and sixty minutes in a primipara. It was, on the whole, the safest, but certainly was the slowest, method. As regards dilatation with Bossi's or Frommer's dilator, after discussing the matter and giving some examples, he came to the following conclusions:—1. When the cervix is obliterated and the os will admit the dilator without difficulty, dilatation can be carried out in about twenty-five minutes, and there will be little or no laceration of the cervix. 2. In cases where the pregnancy has advanced to or near term, even although the cervix is not obliterated, dilatation may be accomplished with comparative safety to the cervix, provided care, time and patience are expended in the operation. 3. In cases where the cervix is unobliterated there is decided risk of extensive lacerations, even although the greatest care is taken. Dr. Kerr then considered the methods of enlarging the canal by making deep incisions, and gave examples of how rapidly (four minutes) the child could be extracted. Lastly, he described a case of Cæsarean section (Dührssen), performed with success and to his entire satisfaction, at the fifth month of pregnancy.

Dr. W. L. Reid said that he had not used the dilator nor seen it used. He had employed the hand to dilate and incisions to enlarge the canal. He had met with few cases where manual dilatation had failed. The method was not rapid. He considered that the cutting method was free from danger, and this even in the days when antiseptic precautions were lax. He had used a probe-pointed bistoury and had incised preferably posteriorly.

Dr. Armstrong (Kirkintilloch) had used Bossi's instrument for some time, and had been quite satisfied with it. He cited cases in illustration. He did not think that at the seventh month there was any difficulty in dilating the cervix without tearing. He had not found any severe lacerations after its use.

Dr. A. W. Russell referred to his cases, and remarked upon those in which laceration had occurred.

Dr. Scott MacGreggor referred to the effect of the point of the instrument, and remarked that the dilatation ought to be slow, as the stretching of the cervix tended to make it contract spasmodically, and that time ought to be given so that such action might be overcome.

Dr. A. MacLennan mentioned that though he had had no experience of the Bossi instrument he had performed Dührssen's operation upon one primipara at full term for a rigid cervix. The suture of the anterior incision had been readily performed without any assistance in a private house.

Dr. Gairdner gave his experience of Bossi's dilator, and thought that the general practitioner would prefer it to vaginal Cæsarean section.

With regard to tearing, the speaker said that the dilatation should be carried out with the eye on the clock to ensure the omission of haste. The cervix can be examined also with the finger from time to time to guard against undue tearing.

Dr. J. NIGEL STARK thought that there was a danger in those days of midwifery becoming too meddlesome. He considered that in certain cases the Bossi was necessary, and failing that incisions. From the remarks of the previous speakers he pointed out that it seemed as if incisions were preferable, because though the cervix did not tear with the Bossi it did during the extraction of the child.

DRS. JARDINE and KERR replied.

REVIEWS OF RECENT BOOKS.

HANDBUCH DER GEBURTSHÜLFE. Edited by F. von Winckel. Vol. i., Part 1. Wiesbaden: J. F. Bergmann, 1903.

This large volume of over 600 pages is the first instalment of a work which promises to hold in obstetrics the place which in gynæcology is now held by the "Handbuch," edited by Prof. J. Veit. It is, of course, a work produced in collaboration, and the list of writers includes the well-known names of Bumm, Chrobak, Döderlein, Dührssen, Freund, Hofmeier, Klein, Menge, Pfannenstiel, Schaeffer, Schultze and Wertheim. It will thus be seen that it is the production of the German school in the widest sense of the term "German," for besides the German Empire, Austria, Switzerland and Sweden each furnish contributors. The preface is in the form of a brief "*apologia*" for the treatise, and Prof. v. Winckel justifies himself for his enterprise by pointing to the enormous literary output of workers in the field of obstetrics during the last thirty years, and the impossibility of adequately dealing with the rapid developments of various departments within the limits of the ordinary text-book. At the same time, since original workers find great difficulty in dealing with contributions scattered through the literature of many languages, an authentic account of recent additions to our knowledge, brought up to date, can no longer be dispensed with. These are the requirements he sets himself to fulfill.

The first section is from the pen of the Editor, and consists of a review of the history of gynæcology from the earliest times to the end of the 18th century; a further instalment is promised in the next volume bringing the review up to the end of the 19th century. This section is full of interest to the curious student of bygone times, and is evidently the work of a keen and cultured mind, but to the busy practical man with hands over-full of work it will probably remain "*terra incognita.*"

The greater part of the volume deals with the physiology and dietetics of pregnancy, and is written in many sections by von Winckel, Strassmann, Pfannenstiel, Goenner and von Rosthorn. The anatomy of the uterus and of the processes of menstruation, ovulation and fertilisation dealt with by Strassmann, is discussed in a large number of short detached sections, a method which is convenient for reference but has the disadvantage of being inimical to continuity of description. To each section is allotted a short bibliography of the most important works referred to in the text. On an average throughout the volume, three German works are quoted to one of all the other nationalities taken together; as an English critic we do not complain, for it has seemed to us that at any rate the most important works of our own language have received recognition; but the all-pervading energy of the German obstetrician has hardly reached a point at which its literary output stands at the ratio of 3—1 against the world. It is possible, however, that excellence in work is more readily appreciated through the medium of one's native tongue than through a foreign language, and thus an unconscious preference is given to the German observer.

It is impossible, as will be readily understood, within the limits of this notice to criticise in detail the very large amount of ground covered by this volume. So far as we can judge without reading from cover to cover, the

work has been done with great thoroughness. One or two points alone can be selected for examination.

The statistics of the birth-rate in the German Empire have been made much use of in connection with the question of fertility. Elaborate tables demonstrate the period of life at which German women are most fruitful, which it may be said does not notably differ from what has long been accepted for European countries, but it is serviceable to have even our accepted propositions put to the test of modern conditions of life. An interesting point which Strassmann brings out from these statistics is the influence which difference in age of the parents exerts upon the sex of their offspring. A husband younger than his wife will tend to produce an excess of male children; a wife younger than her husband will tend to bear an excess of female children. The rule is then formulated that "the older parent has the greatest chance of producing children of the opposite sex." Another interesting result of Strassmann's examination of these statistics is that he shows the existence in Germany of a well-defined "curve" in the birth-rate taken throughout the year. This "curve" is highest from January to April, reaching its maximum point in February; sinks during the summer, and again rises slightly in September. From this "curve" Strassmann deduces the existence of a conception-curve, most marked in the spring and reaching its maximum point in the month of May. This he refers, again, to an increase, from natural causes, of the impulses to sexual union, and suggests that we have here an indication of the previous existence in the human species of a "pairing season" similar to that which is found in so many other mammals. "*Im wunderschönen Monat Mai*" is but the poetical expression, according to the author, of a well-defined natural impulse towards sexual gratification in that particular month!

Development is dealt with partly by Strassmann and partly by Pfannenstiel. The former discusses the ovum, the spermatozoon, the impregnation of the ovum, and the changes which follow up to the fourth week of development. The latter then takes up the tale, discussing the changes which take place in the uterus, and the formation of the fœtal envelopes and the placenta. The completeness of this account of human embryology will be appreciated by the fact that it is dealt with in 30 sections, extending to 130 pages, and including many plates and figures in the text. The earliest stages are discussed in the light of comparative observations, especially those of von Beneden and Sobotta (rabbit and mouse), but it goes without saying that the work of Peters is the foundation of the story, except at such early stages as the process of segmentation and the formation of the blastoderm. But it must in justice to Pfannenstiel be said that he brings forward a large amount of original work with many beautifully executed original plates, which fill in numerous gaps in our knowledge left by Peters's specimen. His account of the human trophosphere and the development of the intervillous spaces should be read by all students of human embryology. The subject is completed by Goenner, who takes up the development of the fœtus and carries it to term, and follows this with an account of the naked-eye characters of the fully-formed placenta, and of the processes of nutrition of the fœtus *in utero*.

The discussion of the changes produced in the maternal organism during pregnancy is from the pen of von Rosthorn. An elaborate account of the changes in the blood is given, but attention will naturally be chiefly directed to the sections dealing with auto-intoxication and albuminuria. The extent to which these subjects have claimed the attention of obstetric observers during the last ten years is very remarkable, and an excellent

account of the results achieved is given by von Rosthorn. This authority expresses definitely his opinion that the early experiments of Bouchard and others of the French school were unreliable, and therefore the theory of auto-intoxication and of a diminished excretion of toxic substances during normal pregnancy must be rejected. In this he but justifies the objections urged against these experiments by Eden and other English critics. In discussing albuminuria full consideration is given to the clinical importance of distinguishing that due to the "pregnancy kidney" from other varieties; and in addition a very valuable account of the macroscopic and microscopic changes to be looked for in this affection is given which will prove of the greatest service to investigators who meet with it for the first time. Its etiology is exhaustively discussed, and in the end the mechanical factors, such as intra-abdominal pressure, compression of the ureter, etc., are regarded as being the most important elements in its causation.

The only clinical subject dealt with in the volume is the symptomatolgy of pregnancy, which has been written by Goenner and von Winckel. The short section by the latter on "Obstetric Auscultation" is an admirable clinical essay, and the volume is closed with a discussion, also by the Editor, of the duration of pregnancy.

No faults can possibly be found in this ambitious work except those incidental to all books written by a number of writers in collaboration; overlapping, repetition and want of continuity are apparent here and there, but if the volumes still to appear are equal in quality to this, von Winckel and his colleagues will have achieved a task which must command the thanks of obstetric students of every degree for many years to come.

DISEASES OF WOMEN. By A. L. Galabin. Sixth edition; much enlarged, with 284 illustrations. London: R. A. Churchill. Price 16s. net.

The present edition of this well-known book has been enlarged to double its former size, and has been thoroughly revised. The name of the author is so deservedly well known as a distinguished representative of English gynæcology that this edition is very welcome, and will be read with interest, not only as a modern text-book on the subject, but also as an embodiment of the writer's matured views based upon a very extended experience. The plan of the book is substantially the same as in previous editions. An additional chapter has been devoted to the technique of operations and the after treatment of these cases. Dr. Galabin states that of late years he has almost discarded drainage of the abdominal wound in favour of gauze drainage through the pouch of Douglas. He also advises the use of morphia as a sedative during the 48 hours following abdominal section. In the description of complications arising after operations there is, however, no mention of "ileus" as a cause of grave anxiety tending at times to a fatal issue.

The chapters on Sub-involution and Hyperæmia of the Uterus and their relation to chronic metritis are worthy of close study, and the conclusions arrived at are evidently founded on much thoughtful observation. Dr. Galabin is a strong advocate for a modified Emmet's operation in laceration of the cervix, believing that it has much effect in promoting involution of the uterus. The treatment of the various forms of endometritis is discussed in detail. "Atmokausis," in the author's

experience, should be reserved for cases of hæmorrhage or senile endometritis, in which the only alternative is removal of the uterus.

In the chapter on Uterine Displacements the value of pessaries is strongly insisted upon, and full instructions given as to their use. Dr. Galabin does not share the views of some modern writers, that pessaries should be practically abandoned as a means of treating displacements. The various operative methods are fully described. For obstinate retroflexion intra-peritoneal shortening of the round ligaments by folding them on their long axis is recommended. The author also advocated Lefort's operation for severe cases of prolapsus. This consists essentially in uniting raw surfaces on the anterior and posterior vaginal walls, thus forming a median septum which effectually prevents descent of the uterus.

The chapter on Uterine Myomata has been largely re-written, and the views expressed are in accordance with the results obtained by modern methods of treatment. Whilst not advocating the indiscriminate removal of all myomata, Dr. Galabin states that "any woman who has a fibroid tumour rendering her an invalid or producing anæmia, or who has a growing tumour and is not near her menopause will be wise to choose operation." He prefers supra-vaginal hysterectomy in the majority of cases. Myomectomy is considered to possess a very limited sphere of usefulness. We are somewhat surprised that the ecraseur should still be recommended for the removal of sub-mucous fibroids *per vaginam.*

In the treatment of Cancer of the Cervix vaginal hysterectomy should be adopted in preference to the abdominal route, as, in the author's opinion, the advocates of this method, with removal of glands, have not proved the advantages claimed for it. It is interesting to note that Dr. Galabin has tried the effect of Roentgen rays in these cases, but without any obvious benefit. Similarly he has found removal of the ovaries to have little effect in checking the disease. "Rodent ulcer" of the cervix is separately described as a very rare disease, closely resembling cancer, but no recent cases with accurate microscopic descriptions appear to have been published.

The subject of Inflammatory Diseases of the Appendages and Pelvic Peritoneum is fully considered. The value of palliative methods in acute cases is insisted upon, but if there is evidence of pus formation in the tube vaginal section should be preferred in acute cases. If both appendages are extensively diseased hysterectomy, either abdominal or vaginal, may be carried out. Dr. Galabin prefers to leave one ovary, preferably the right, whenever it is possible to do so safely. He does not, however, discuss the indications for conservative operations, such as resection of the ovary, salpingostomy, etc.

Chapters are devoted to Hæmatocele and Intra-peritoneal Hæmorrhage, but the subject of extra-uterine gestation is not considered in detail. The management of ovarian cysts and fibroid tumours during pregnancy and labour is omitted as being more suitably described in works on obstetrics.

This book, in many respects a new production, is a valuable contribution to the gynæcological literature of the day. It is written throughout with scientific accuracy, clearness of expression and well-balanced judgment. Special attention is devoted to the clinical aspects of the diseases of women, and the details of treatment with operative methods are admirably related. It contains much that is of the greatest value to the practitioner, who will find it a reliable guide, and it will also repay careful study on the part of the operating surgeon. The illustrations throughout are numerous and well executed. They include many micro-photographs. The letterpress is excellent.

LEHRBUCH DER GEBURTSHÜLFE. By Max Runge, Ord. Prof. der Geburtshülfe u. Gynäkologie und Direktor der Universitäts-Frauenklinik zu Göttingen. Seventh edition. Berlin: Julius Springer, 1903.

This book is a very good example of what the student requires in a text-book of midwifery, and that it has been appreciated is shown by the fact that this is the seventh edition which has appeared since its first issue in 1891. It is not burdened with overmuch anatomical and physiological matter, and we notice with satisfaction that the embryology is strictly confined to the development of the placenta and membranes, and that there is no attempt to give a general sketch of the subject as in some of the recent American text-books. It is also well arranged, the less important and more contentious matter being put into slightly smaller type and for the most part at the end of the chapters, so as not to interefere with the continuity of the text. The teaching is forcible and fairly dogmatic, and the indications for any line of treatment are fully discussed. This edition has been brought well up to date; the results of the discussion on eclampsia at the Giessen Congress of 1901 and of the recent work on chorionepithelioma and cystic mole have been incorporated in the text. At the same time the author shows a praiseworthy caution in admitting new methods, the position of which has not been fully established by time and experience; for instance, the newer means of rapidly dilating the cervix by instruments of the Bossi type are not considered, on the ground that their value is still undetermined. He also keeps closely to the practice of his own clinic, and the English student will note many small matters in which this differs from that found in his text-books. The axis-traction forceps do not find favour with Prof. Runge, nor does the cephalotribe, and both instruments are dismissed in a few lines of small print. The same scant treatment is given to the application of forceps to the after-coming head. While advocating care in seeing that no portion of the placenta is retained, the author also addresses a few words of caution to the overzealous attendant, and these are worth quoting, as advice of this kind is not often given in our teaching:—"If a portion of the membranes is torn off this is not a sufficient reason for passing the hand into the uterus for its removal. Exploration of the uterus is more dangerous than retention of portions of membrane; they will be expelled with the lochial discharge."

The later chapters are perhaps the best in the book, especially those on obstetric operations and on the varieties of contracted pelvis, which are described more fully than usual in works of this size. The volume is well illustrated and handsomely turned out, but we doubt whether there is a clientele in this country for such a book. It does not go far enough into the subject for a reference work, and there are quite enough text-books of midwifery, British and American, from which our students and practitioners can select one written in their mother tongue.

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